LOCAL FOOD PERCEPTIONS AND SHOPPING BEHAVIORS IN RURAL NORTH CAROLINA: A NOVEL, RETAIL-BASED APPROACH FOR PROMOTING HEALTH?

Beth N. Hopping

A dissertation submitted to the faculty at the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the Department of Nutrition (Intervention & Policy) in the Gillings School of Global Public Health.

Chapel Hill
2016

Approved by:

Alice Ammerman

Molly De Marco

Margaret Bentley

Dan Ariely

Rebecca Dunning

Haibo Zhou

© 2016
Beth N. Hopping
ALL RIGHTS RESERVED

ABSTRACT

Beth N. Hopping: Local food perceptions and shopping behaviors in rural North Carolina: A novel, retail-based approach for promoting health?
(Under the direction of Alice Ammerman)

The prevalence of obesity and chronic disease remains high in the United States despite decades of public health research aiming to improve dietary quality. People of lower socioeconomic status (SES) and residents of rural areas are particularly at risk. The food environment is a key mediator of diet-related health disparities. There is evidence associating local food purchasing with healthier eating behaviors. However, little is known about whether lower-SES and rural consumers have positive associations with local food and would preferentially buy it in the grocery store context or whether local food purchases might ultimately increase diet quality and fruit and vegetable intake.

The purpose of the present study was to (1) characterize perceptions of locally grown food and self-reported barriers and facilitators to purchasing it among frequent shoppers of three rural grocery stores; (2) design and implement multiple small-scale, store-based interventions aimed at increasing local food purchasing in grocery stores serving lower-income, rural consumers; and (3) measure the individual- and organizational-level effectiveness of local food purchasing intervention strategies. We partnered with three grocery stores located in rural, lower-SES communities in North Carolina. A formative, qualitative study was conducted through in-depth interviews with frequent shoppers (n=22) of the three stores, followed by the development and testing of two distinct local-food-based intervention strategies. In-store consumer intercept surveys (n=67), store observations (n=7), and post-intervention interviews with store managers

(n=2) and participating farmers (n=2) provided insights into program implementation and maintenance.

We found positive attitudes toward locally produced food among participants. Supporting local farmers and their community's economy were primary motivators, though perceived price was cited as a common barrier. We developed two store-based interventions designed to increase local food purchasing informed by: (1) constructs that emerged from formative work (*awareness of local food availability*) and reported values around local food purchasing (*reciprocity with farmers in the community*), and (2) constructs from the behavioral (*social proof*) and marketing (*cross-selling*) bodies of literature. Intervention components included signs, recipe cards, stickers, and a consolidated local produce display. Interventions lasted for the duration of the local produce sourcing season (Store B = 8 wks; Store C = 6 wks). One of three participating stores (Store A) was ultimately unable to source local produce for the intervention phase of the study. Store B implemented intervention materials with high fidelity; Store C implemented the intervention with moderate and diminishing fidelity. Few shoppers reported noticing the intervention signage in either store, but 88% of respondents reported a preference for local foods, and 70% reported a desire to purchase local food on their next shopping trip. Prices for local and nonlocal produce items were kept equal, thus eliminating the most commonly cited perceived barrier to purchasing. Managers at both stores reported intending to continue sourcing local produce beyond the study period, despite the increased work required to do so. Findings from this study indicate that promotion of local food is acceptable to both participants and retailers in rural, lower-SES communities. However, further work is required to identify the effectiveness of different marketing approaches and the impact on quality of food purchasing.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CSA	Community-supported agriculture
IRB	Institutional review board
NC	North Carolina
NCGT	North Carolina Growing Together
SEM	Socio-ecological model
SES	Socio-economic status
UNC	University of North Carolina
US	The United States of America
USDA	United States Department of Agriculture

CHAPTER I: INTRODUCTION

Background

The prevalence of obesity and chronic disease remains high in the United States despite decades of public health research aiming to improve dietary quality, and people of lower socioeconomic status (SES) are particularly at risk.[1–4] The food system is an axis for many important factors related to human health and environmental sustainability. Improving dietary quality is a goal that can be achieved by addressing multiple levels of the socio-ecological model (SEM). Encouraging the purchase of unprocessed, local foods may be one strategy for improving dietary quality while also contributing to environmental sustainability and community economic development through a sense of loyalty to food produced in one's own community. Despite evidence of growing consumer preference for locally grown food,[5,6] limited research exists about local food preferences among rural and low-SES individuals who tend to lack access to fresh produce and are disproportionately affected by diet-related illness.[1–4,7] We also know little about whether increasing the purchase of local food will result in improved dietary intake among lower-income consumers.

This study seeks to expand "local food" research to mainstream markets in lower-income and rural communities. Prior research has focused on farmers' markets and Community Supported Agriculture (CSAs),[8,9] even though grocery stores are the primary site for food acquisition in the US.[10–12] Market research on local food has also centered on higher-income consumers, while healthy food access in rural and low-income communities is a well-documented concern.[2,7] We aimed to fill these research gaps by focusing on rural, low-SES

consumers in mainstream grocery stores. Our research setting was three grocery stores located in rural communities in North Carolina (NC) designed to serve lower-income consumers.

To determine whether local food preference might contribute to healthier food choices, we must first understand the factors that influence low-income consumers' decisions about whether or not to purchase local foods when they are available. Issues like price differences, awareness of availability, and perceived benefits of purchasing local foods (such as nutritional value or supporting local producers) may be influential in consumer purchasing decisions. Qualitative findings were used to inform theory-based intervention strategies, which were implemented in two grocery stores to increase the purchasing of locally grown food and improve the healthfulness of food purchasing and consumption in rural and low-SES communities in North Carolina. Using the Theory of Planned Behavior as a framework for our intervention causal pathway, we identified *intention to purchase local food* as a reasonable construct that was both feasible to measure and a reliable predictor of behavior.[13,14]

Research Aims

The aims of this research were as follows:

Aim 1. Characterize rural, lower-socioeconomic status consumers' perceptions of local food and their self-reported barriers and facilitators to purchasing these foods, using in-depth interviews with frequent shoppers.

Aim 2. Implement multiple small-scale, theory-informed, store-based interventions aimed at increasing local food purchasing in stores serving lower-income consumers and assess multiple process measures throughout implementation.

Aim 3. Measure individual- and organizational-level effectiveness and acceptability of local food purchasing intervention strategies.

CHAPTER II: LITERATURE REVIEW

The Food System

Overview

Many complex, interrelated determinants impact human health, including economic, social, and environmental factors.[3,22] When designing programs to improve health through nutrition, the complex nature of individual dietary behaviors and the degree to which they are influenced by external factors suggests that environmental-level approaches may yield greater effectiveness than those targeting personal choice and individual-level behavior change.[2,22]

The food system, from food production through consumption, includes multiple levels of potential influence on food-related behaviors. The current national food system favors larger-scale farms, a vertically integrated supply chain, and broad distribution networks.[23,24] While multiple definitions of "local food systems" exist, here we refer to food that is consumed within the same state (i.e., North Carolina) in which it was produced (with reasonable exceptions made to include neighboring states in border communities).[23,25]

Local food systems can have an economic multiplier effect in a given community, enhance social ties and promote social interaction, lessen environmental burdens through reduced transportation emissions, maintain agricultural lands, and improve access to healthy foods, among other demonstrated potential benefits (Figure 2.1).[5,26–31] Thus, strengthening local food systems has the potential to foster healthier community environments in support of individual health.

Promoting local food in grocery stores may improve dietary quality

Grocery stores constitute the primary locale for food purchases in the US,[10,11] making them an ideal setting for efforts to improve the healthfulness of foods purchased and consumed. Food retail-based nutrition interventions typically focus on encouraging consumers to purchase healthier food, and a variety of strategies have been tested with mixed results.[12] As we have learned from decades of public health messages telling us to "eat better," determinants beyond knowledge alone influence individual dietary behaviors.[16,32,33] In fact, consumers may grow weary of the healthy eating messages or even perceive foods labeled "healthy" to taste bad.[34] Retail-based approaches have focused on changing the retail environment through increasing the availability of healthy foods and making changes to the layout or structural components of the store in a manner to encourage healthier food choices.[33,35–38]

A novel method for improving healthy eating may include capitalizing on the current trend toward favoring locally produced foods. There is evidence that consumers of local food make healthier food choices.[39] Potential factors influencing this include perceived economic, social, and environmental benefits to supporting one's local food system. Less is known about whether these factors influence lower-income consumers as well, who face greater resource constraints and may have different food-related priorities.

Local food literature

"Local food" has become a much-discussed topic in recent years, but there is little evidence to date that foods produced and consumed within close proximity provide greater nutritional value (i.e., nutrient density) than the same types of foods that have been transported from a greater distance.[5,40] In other words, an apple grown in one's backyard is not necessarily more

nutritious than an apple grown on the opposite side of the country and shipped to the neighborhood grocery store. However, a positive association has been observed between local food purchasing and fruit and vegetable consumption, indicating a potential benefit to buying local.[39] Auxiliary benefits of supporting and strengthening local food systems include: keeping jobs and money in communities, enhancing social ties, and reducing the distance food must travel to consumers, thereby potentially reducing carbon emissions and environmental degradation.[40,41]

Grocery stores are the primary source of American food acquisition[10,11]; thus, they provide a logical target for interventions aiming to increase consumer demand and local food purchasing. Two of the strengths associated with intervening through grocery stores include the potential to reach a large proportion of the population, and the fact that limited change in consumer behavior is required. The literature on grocery store-based interventions primarily focuses on strategies to increase fruit and vegetable purchasing. In a review of such studies,[33] four strategies were identified as typical approaches for increasing fruit and vegetable purchasing: point-of-purchase information; price reductions and coupons; increased availability, variety, and convenience of fruits and vegetables; and using promotions and advertising. While the feasibility of these strategies is supported, there is limited evidence of their effectiveness for influencing eating behavior.[33]

Increasing consumer demand for fresh, local foods may have the potential to enhance fruit and vegetable purchasing and consumption,[39] as well as the viability of the local food system (*Sitaker et al., in press*). The viability of the local food system is important for many reasons, but is important in the context of this program if it leads to greater purchasing and consumption of fresh, unprocessed foods like fruits and vegetables. To accomplish this, we must first understand

the factors that influence grocery store availability of fresh, local foods (e.g., barriers to sourcing directly from area farmers) and consumers' decisions about whether or not to purchase these products when they are available. Consumer purchasing behavior strongly influences the grocery store environment.[42] Thus, an enhanced understanding of how to drive consumer demand for local products among low-income consumers will provide insight into appropriate store-based intervention strategies.

Existing literature about consumer behavior indicates that individual-level factors, including freshness, quality, health benefits, and food safety, are primary issues motivating local food purchasing.[43–46] Community-level factors like "giving back to the community," "keeping dollars in the community," "supporting small farmers," "farmers receiving fair returns," and various other social and environmental issues influence consumers to a lesser extent. Although there is currently no legal definition of "local," many people associate the local label with foods being "natural" and "pesticide-free" in addition to the standard geographic connotations.[47] Price differences between local and nonlocal foods may be one deterrent for consumers, especially among lower-income populations. Studies have found that although many people (47% of survey respondents) believe local products are of greater value and are worth spending more money for, they still may not be willing to pay higher prices.[43,48] Further, a majority of survey respondents in one study (61%) indicated that lower prices would encourage them to purchase more locally produced foods.[43] Additional studies, however, have found that people are willing to pay extra for food that they believe supports health, social, and environmental benefits.[43,47,49]

Various demographic characteristics are associated with local food purchasing behavior. Women tend to be slightly more likely to purchase local food than men,[43,50] which may be due to the finding that women are more likely to be impacted by social influences.[51] Consumers who

report having a connection to agriculture or live in a rural area, as well as individuals with higher education and income levels, may be more likely to purchase local foods.[52] A survey conducted in North Carolina found that white families, lower-income families, families in rural areas, families with children who ate 5 or more servings of vegetables per day, and families with children in poor health were more likely to purchase local food.[53] However, additional studies report that demographic factors are inconsistent in predicting the likelihood of local food purchasing, and that "attitudinal factors" (e.g., "liking to cook") are more strongly predictive.[52,54,55]

Mintel Group Ltd, a privately owned market research firm, recently investigated consumer attitudes and behaviors around local food purchasing, and the recommendations generated for grocery marketers included the following:

"Most Americans are drawn to the selflessness of living local. They acknowledge the importance of having community pride, want to support their local economies as well as American-made products and services, and find value in giving back to their local areas. However, they also acknowledge that there is a limit in what consumers can reasonably do to support their communities, and much of that determination comes down to convenience. Consumers want to purchase local products—namely the local produce that they tend to most associate with their own health—but they don't want to go out of their way to get them. Marketers should be encouraged to find more ways to bring the local products consumers want directly, or at least in closer proximity, to them. In this way, local involvement can be positioned as being mutually beneficial to communities as well as the residents on which communities depend. Consumers wanting at least some personal gain from their local efforts will also feel better accommodated."[43,56]

More respondents reported purchasing local foods in the "grocery and retail stores in which I regularly shop" than anywhere else, including farmers' markets.[56] These findings, presented to grocery marketers and retailers, indicate that there is a perceived market for local food, and that retailers simply need to make it available and convenient to consumers. Interestingly, although most food production occurs in rural and/or low-SES areas, the perception among retailers appears to be that this consumer base either does not care enough about or cannot afford locally produced food (*personal communication with food retail corporate executives, 2014*), even though this contradicts previous research among low-income individuals.[53]

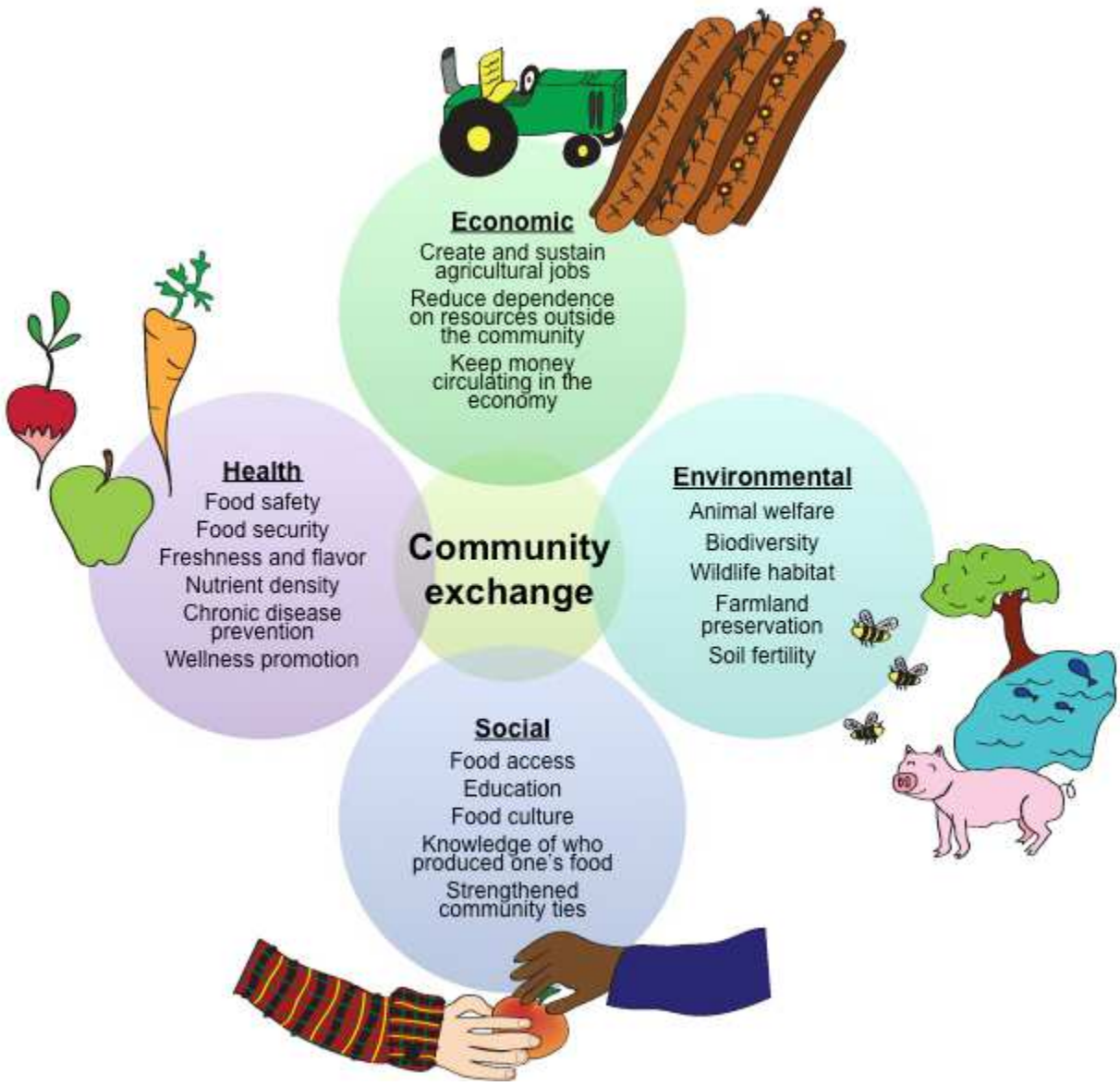

Figure 2.1. Potential impacts of localized food systems

CHAPTER III: METHODS

North Carolina Growing Together Study (NCGT)

Overview of study

The North Carolina Growing Together (NCGT) project is a five-year (2013—2017) USDA-funded project, which serves as the parent study for this dissertation work. NCGT aims to bring more locally produced foods into mainstream markets, strengthening the economics of small- to mid-sized farm and fishing operations and their communities in North Carolina. The long-term goal of NCGT is to enhance food security by increasing productivity and profitability for producers while improving aspects of the system to increase access and affordability for consumers. NCGT has partnered with two large food buyers, a regional grocery chain and a military base, through which they will address major constraints to scaling up local food systems. Ultimately, the project seeks to create a nationally relevant model that is applicable to other major distribution networks in the state and across the country. The project works within the existing large-scale wholesale distribution chain, through which the vast majority of food travels, to determine the potential for conventional systems to join with emerging food hubs to address the bottlenecks of local food systems in a way that values sustainability and meets growing consumer demand. Existing distributors already have trucks, warehouse space, cold storage capacity, connections with processors, and markets, which often need to be developed from scratch by emerging food hubs. NCGT aims to develop models of local food supply chains that connect new, innovative food hubs with existing traditional food distribution networks to achieve triple bottom line (environmental, economic, and social) objectives and meet the needs of the

institutional and retail partners. Where food hubs do not exist, NCGT works with existing supply chain participants to effectively change their business practices and systems to meet this new demand in a way that also values sustainability and achieves triple bottom line objectives. These principles include fair pricing for producers and support not only for large farms, but for small- and mid-sized farms as well, which are at the forefront of the growing local foods movement.

Food retail partner

The food retailer partner for the NCGT project is a family-owned grocery store chain located in North Carolina, South Carolina, and Virginia. As a company, they have an interest in maintaining a loyal customer base. One of their branding strategies is to emphasize their local focus and engagement with Carolina communities. They are currently participating in the "NC 10% Campaign," an initiative by NC State University's Center for Environmental Farming Systems, which encourages individuals and businesses to spend 10% of their food budget on locally grown foods (http://www.ncsu.edu/project/nc10percent/index.php). The company has also offered the "Carolina Crate" during summer months, in which participating customers receive a box of locally grown produce each week. They have agreed to partner with the research team to develop an initiative to promote local foods as a way to enhance consumers' perceptions about the engagement of their company in the community through increased support of local food producers (i.e., meat, seafood, dairy, and produce growers). The company is in the process of increasing their direct-to-store purchasing of local foods. Direct-to-store deliveries (DSD) do not operate through a large distribution company and therefore rely on the establishment of relationships with individual food producers located in close enough proximity to deliver directly to stores. The company is collaborating with the NCGT project to identify potential store-based

strategies to increase consumer purchasing of local products. The partnership between the company and the research team provides a win-win opportunity, in which the company benefits by enhancing customer loyalty and increasing sales of perishable foods, and the communities benefit from increased access to healthy foods and strengthened local food and economic systems. The company's history of commitment to purchasing from NC food producers provides evidence for the feasibility of their sustained participation in this project.

Our food retail partner currently defines "local" in two ways. If a product in the store is specifically labeled "local," it was produced or manufactured in North Carolina, South Carolina, or Virginia, as these are the states in which they have stores. Products labeled "homegrown" can actually be traced to the specific farm or location of production, and the location and the producer are noted either on the package itself or on signage nearby. In-store labeling of local foods in the stores has historically been inconsistent and may be confusing to customers.

Local labeling within the company sales database is also inconsistent. While most packaged foods, including meat, seafood, and dairy, are flagged with a "local" designation when appropriate, much of the fresh produce is not. Produce packaged in clamshell containers (e.g., cherry tomatoes, strawberries, blueberries) do carry "local" sales flags, but unpackaged items (e.g., cabbage, sweet potatoes, cucumbers) typically do not. Cashiers enter the same PLU (price look-up) code for unpackaged items, regardless of local or nonlocal production. Inconsistent local flags are primarily an issue with DSD produce, which is a primary target of this study.

Pilot study

This section describes the pilot study conducted in this dissertation work as a component of the NCGT project. Additional information about the methods employed is presented in associated

chapters.

a. Qualitative data collection

Qualitative data were collected during Aims 1 and 3. In Aim 1, we recruited 22 frequent shoppers from our three partner stores to participate in in-depth interviews about their typical shopping habits and their perceptions and preferences around local food. The interview guide was semi-structured and informed by a socio-ecological model (SEM) developed to describe the many factors relating to grocery shopping behavior (Figure 3.1).[12] In Aim 3, we conducted post-intervention in-depth interviews with the store managers and farmers who participated in the interventions. This semi-structured interview guide was developed to elicit personal opinions and experiences related to their participation in the local-food-based pilot interventions.

b. Process data collection

To understand the details of intervention implementation, we conducted a process evaluation informed by strategies described in other studies. Two commonly assessed constructs in the process evaluation literature are reach (the number of members of the targeted audience who received any component of the intervention) and dose (the number of times each target audience member received any component of the intervention).[57] In the grocery store setting, these two constructs are difficult to measure. Grocery stores do not have an easily identifiable population from which a denominator (total target audience) can be drawn for analysis. In their process evaluation of the Baltimore Healthy Stores (BHS) intervention trial, Gittelsohn et al. chose to use the total population of East Baltimore, their intervention community, as the

denominator for an assessment of reach.[58] They measured dose by evaluating the number of intervention components delivered to each of the participants in their interactive sessions.

In this study, all intervention components were passive. Without the in-store activities (e.g., taste tests) like those delivered in the BHS study, we were unable to determine the number of people who were exposed to our interventions. Thus, we focused on the third commonly evaluated process measure, fidelity (how well the intervention components were delivered in comparison with the original design).[57] The data collection tools and methods used for this evaluation are presented in Chapter 5.

c. Sales data collection

Sales data are continuously collected and analyzed by the food retailer. Data are additionally tracked using customer loyalty cards when possible. For this study, the retailer agreed to provide the research team with sales data from our intervention and comparison stores from 4 weeks prior to intervention implementation through 4 weeks after the intervention phase was complete. To allow for a more informative analysis, we were to receive two versions of the sales data. The first dataset was to include sales of the top 15 produce items (by sales volume) across lifestyle segments by time. Lifestyle segments are the categories the retailer subdivides their consumers into based on the types of purchasing they typically do, as tracked using the consumer loyalty cards. The segments differentiate between those who are, for example, "premium cooks," "fresh enthusiasts," "waistline watchers," "thrifty families," and "tight budgets." These data would allow for a more in-depth analysis as to the potential effectiveness of intervention strategies across different "types" of consumers. The inclusion criteria for each

lifestyle segment are proprietary, but the names are descriptive enough to hint at the types of products or budgets of customers in each category.

The second type of sales data was to include total sales for each store by product category (e.g., meat, dairy, produce, packaged snacks, etc.), by store, and by time. This dataset was to be used to evaluate whether the interventions were successful at increasing total sales of fresh produce relative to other product categories.

After receiving the lifestyle segment data from our corporate partner, we were told that the company was discontinuing their use of this analytical style due to the difficulty of accurately interpreting the data. We were later given a new dataset that included their top 16 produce items by sales volume. Sales were displayed in units sold by month from June through September for 2014 and 2015. Data were provided for our two intervention stores and an aggregated comparison group of 17 other stores in the company chain. We were unable to access data for produce overall or sales in any other produce category (e.g., snack foods, frozen produce, meat, dairy).

d. Age

Age was reported at the in-depth interviews and in-store intercept surveys using the following categories (in years): 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, ≥75.

e. Education

Participants reported their level of educational attainment in the in-depth interviews and in-store intercept surveys by selecting one of the following categories: less than a high school diploma, high school diploma or the equivalent, trade/technical/vocational training, Associate's

degree, Bachelor's degree, Master's degree, professional or doctoral degree. In-store intercept survey respondents were also asked to report the educational attainment of other adults in the household using the same categories.

f. Income

Participants reported their income level at the in-depth interviews and the in-store intercept surveys as ≤$20,000, $20,001-$25,000, $25,001-$50,000, $50,001-$75,000, $75,001-$100,000, and >$100,000. They were also given the option to decline responding to this question.

g. Participation in food assistance programs

Participants were asked to report participation in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and the Supplemental Nutrition Assistance Program (SNAP) at the in-depth interviews.

h. Household composition

Participants reported the number of people who lived in their household and their relationship to them, including number of children (<18 years of age), partners, and other relatives or adults currently living with them.

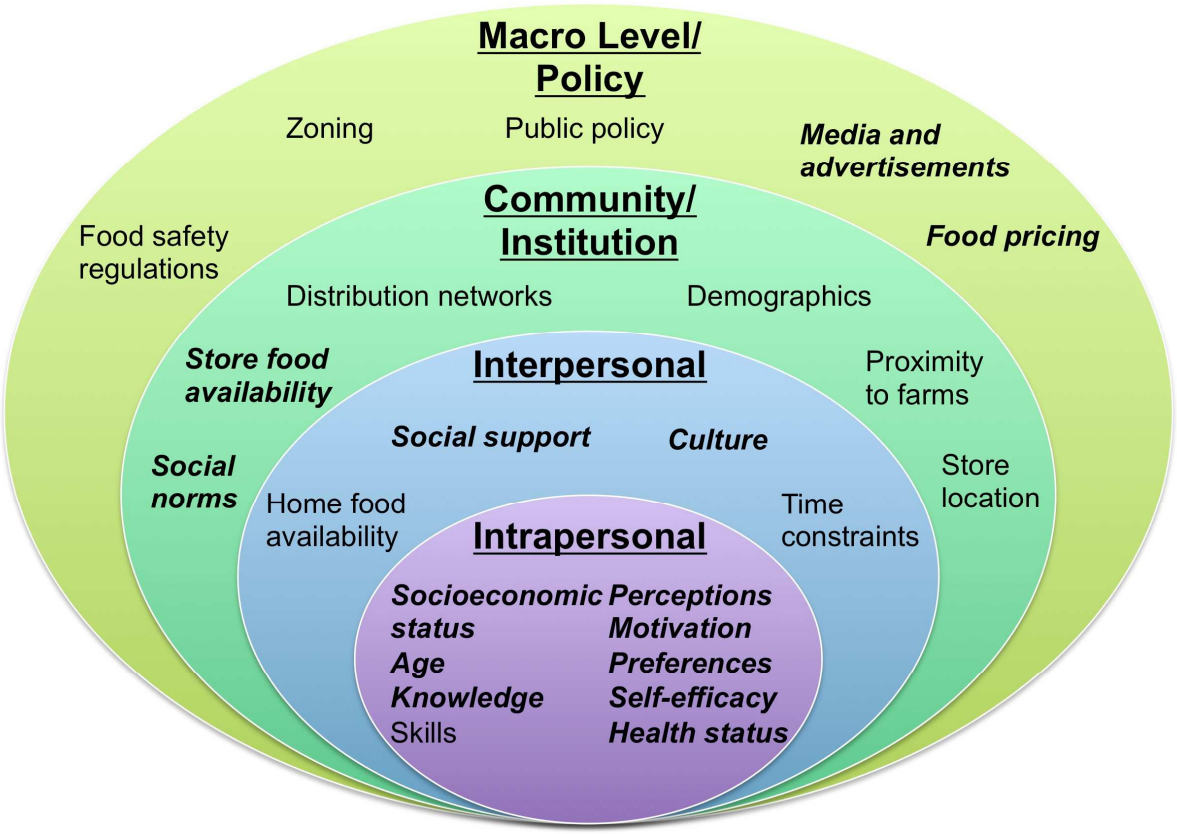

Figure 3.1. Socio-ecological model of grocery shopping behavioral determinants*
*Determinants addressed in the consumer in-depth interview guide are in bold text

CHAPTER IV: "HOMEGROWN TOMATOES": A QUALITATIVE STUDY OF THE MEANING AND DESIRABILITY OF LOCAL FOOD AMONG LOWER-INCOME RESIDENTS OF RURAL NORTH CAROLINA

Overview

Background: The prevalence of obesity and chronic disease remains high in the United States despite decades of public health research aiming to improve dietary quality. People of lower socioeconomic status (SES) and residents of rural areas are particularly at risk. The food environment is a key mediator of diet-related health disparities. There is evidence associating local food purchasing with healthier eating behaviors. However, little is known about whether lower-SES and rural consumers have positive associations with local food and would preferentially buy it in the grocery store context.

Objective: To understand the perceptions and values around locally grown foods among rural and lower-socioeconomic status residents of North Carolina.

Methods: Semi-structured in-depth interviews were conducted with a convenience sample of 22 frequent shoppers at three rural grocery stores to (1) identify what factors influence their food purchasing decisions in general and local foods in particular, (2) characterize shoppers' perceptions of "local" foods, and (3) identify types of store-based interventions that these consumers believe might have potential for increasing the proportion of local foods they purchase.

Results: Participants varied in their definitions for "local" food; most used geographic or political boundaries, and some felt that the definition would change depending on the retail outlet. Farmers' markets and farm stands were perceived to source produce "more locally" than

grocery stores, which might use a statewide or regional definition. We found positive attitudes toward locally produced food among participants. Supporting local farmers and their community's economy were primary motivators toward local food purchasing. Price and quality were two attributes commonly placed above localness in terms of importance. The most frequently suggested strategy for increasing local food purchasing in grocery stores was basic advertising with transparency as to the specific farmer and farm location.

Conclusion: Our findings indicate that locally grown foods are desirable among lower-SES residents of rural North Carolina. Contributing to their community's economy and supporting local farmers were important dimensions of participating in their local food system. Healthy local food promotion may be an acceptable strategy to increase healthy food purchasing in this population. If they wish to participate effectively in the local food retail sector, grocers should be mindful of the deep sociocultural framework through which their customers view local food.

Background

The prevalence of obesity and chronic disease remains high in the United States despite decades of public health research aiming to improve dietary quality, and people of lower socioeconomic status (SES) are particularly at risk.[1–4] The food system is a natural locus for addressing multiple important factors related to human health, economic wellbeing, and environmental sustainability, specifically by addressing multiple levels of the socio-ecological model (SEM). Encouraging the purchase of unprocessed, locally grown produce may be one strategy for improving dietary quality[39,59,60] while also contributing to strengthened rural economies and preserving farmland due to a sense of loyalty to food produced in one's own

community or region.[28,61] Despite evidence of growing consumer preference for locally grown food,[5,6,62–64] limited research exists about local food preferences among rural and low-SES individuals who tend to lack access to fresh produce and are disproportionately affected by diet-related illness.[1–4,7,59]

In 2014, an estimated 22.2% of North Carolina's 9.9 million residents were residing in rural areas.[65] Rural-dwelling North Carolinians disproportionately experience unemployment, poverty, and reduced access to healthcare,[66] but they also represent a large share of the state's consumer base, in part due to the availability of capital through federal food benefits programs. The food system impacts employment, economic development, and health through the supply chain operating from producers to grocery stores to consumers.

Grocery stores constitute the primary retail outlet for food purchases in the US,[10,11] making them an ideal setting for efforts to improve the healthfulness of foods purchased and consumed. Food retail-based nutrition interventions typically focus on encouraging consumers to purchase healthier food, and a variety of strategies have been tested with mixed results.[12] As we have learned from decades of public health messages telling us to "eat better," determinants beyond knowledge alone influence individual dietary behaviors.[16,32,33] In fact, consumers may grow weary of the healthy eating messages or even perceive foods labeled "healthy" to taste bad.[34] A novel approach for improving healthy eating may include capitalizing on the current trend toward favoring locally produced foods. There is some evidence that consumers of local food tend to make healthier food choices.[39,59,60] However, little is known about lower-SES and rural consumers' perceptions and behaviors around local food, which limits our ability to design effective local-food-based healthy eating interventions in these communities, or even to know whether this may be a viable intervention strategy.

We know little about whether increasing the purchasing of local food will result in improved dietary intake among lower-SES and rural consumers or whether this strategy is culturally relevant. As part of a larger study to improve sourcing of local food through retailers, and in hopes of increasing fresh fruit and vegetable purchasing among rural, low-SES consumers, we conducted formative qualitative work to understand whether the promotion of local produce would be appealing to these consumers. The present study describes the grocery shopping behaviors, perceptions, and values around locally grown foods among a sample of primary household shoppers in three rural communities across North Carolina.

Methods

Grocery store setting

This qualitative study was conducted as part of a larger project aiming to bring locally produced foods into mainstream markets in North Carolina. A regional food retail chain is a primary partner on this project and is composed of a standard grocery store chain and its lower-priced sister stores. The lower-priced stores are primarily located in rural communities in North Carolina and served as the recruitment sites for the present study.

Three stores were identified to participate in this study with the help of our corporate retail partner (Figure 4.1). Stores were selected for their ability to source local foods (a necessary criterion for participation in the experimental phase of the larger research project) and a willingness to cooperate among the store managers. Managers from each store verbally consented to collaborate with the research team. Community demographics are presented in Table 4.1.

In-depth interviews

Semi-structured in-depth interviews (IDIs) were conducted with a convenience sample of 22 frequent shoppers at three rural grocery stores to (1) identify what factors influence their food purchasing decisions in general and local foods in particular, (2) characterize shoppers' perceptions of "local" foods, and (3) identify types of store-based interventions that these consumers believe might have potential for increasing the proportion of local foods they purchase. We explored these themes through four primary research questions that guided the IDIs:

a. What are consumers' household demographics, educational attainment, and dietary preferences generally?

b. What are consumers' perceptions of "local" food? (E.g., what is it, where does it come from, do they like to buy it, and is it of value to them in terms of health or other benefits?)

c. What factors play into consumers' purchasing decisions in general and around local foods in particular? (E.g., price, WIC/SNAP participation, availability, personal values like supporting local farmers.)

d. What could a grocery store do to encourage consumers to increase their intake of healthy food options by buying "local?"

Data were collected through IDIs with primary household shoppers who frequent one of the three partner grocery stores. A semi-structured interview guide was used to elicit open-ended responses about shopping behaviors and perceptions of local food.

Participants were recruited through in-person intercept screening surveys at each of the three grocery stores. Those who met inclusion criteria were asked to provide their name and contact information for IDI scheduling. Six to eight individuals were recruited from each store

(N = 22 consumers). Inclusion criteria included: ≥18 years of age, primary household shopper, identified one of the three partner stores as a primary food shopping location, and English language fluency. IDIs took approximately 45 minutes to complete and were conducted in person at the participant's location of choice. Most participants chose to hold the interview at a fast food restaurant, citing their common use as meeting places in the community. Interviews were audio recorded to allow for verbatim transcription. After completion of the IDI, participants were given a $25 gift card to the partner grocery retailer as compensation for their time. Recruitment for new interviews ended when no new information was emerging for the primary research questions, and it was determined that saturation had been reached. All procedures involving human subjects were approved by the Institutional Review Board of the University of North Carolina at Chapel Hill. Written informed consent was obtained from all participants prior to initiation of the interviews.

Analyses

Interviews were transcribed verbatim by a third-party transcription service (Transcripty) and imported into Dedoose qualitative analysis software (Version 6.2.17, SocioCultural Research Consultants, LLC, Los Angeles, CA) for coding and analysis. All transcripts were coded by the primary researcher (BNH). The codebook was developed iteratively throughout the coding process. Reading of the transcripts and initial coding began as soon as the first interviews were completed and transcribed, and emergent themes were specifically probed in future interviews.

This qualitative study was designed for two primary purposes: 1) provide greater depth to our understanding of how rural and/or low-SES North Carolinians make decisions about shopping for food in general and local food in particular, and 2) serve as the formative phase of a

larger research project and provide insight into relevant determinants to be targeted by in-store promotional strategies for increasing local food purchasing in lower-cost, rural grocery stores. Our analysis scheme therefore included two basic components.

First, a deductive approach used the interview guide as a template for developing a preliminary codebook and grouping data into themes about perceptions of local food, decision-making influences and behaviors in the grocery store, and other important concepts. Second, an inductive approach allowed for more detailed explorations of the data. We read the data for repeated expressions of phenomena like feelings, beliefs, and behaviors that were not specifically asked about in the interview guide.

Results

Participant demographics

Twenty-two individuals participated in this study. Participant demographics are presented in Table 2. Thirteen women and nine men participated. Respondent ages ranged from 21-93 yrs. All participants identified themselves as either White or African American/Black. Eight of 22 participants (36%) held high school diplomas or the equivalent, and six (27%) held Bachelor's or more advanced degrees. Only two households reported earning ≥$100,000. Most earned between $20,000 and $49,999 (n=8) or $50,000 and $99,999 (n=6). Five households earned <$20,000/year, three of which had one or more children. More than half of all households reported no children aged 18 years or younger (n=12). Eight households had one or two children, and two households had four or more children. Five participants reported participating in the Supplemental Nutrition Assistance Program (SNAP); no one reported participating in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). The proportions of

SNAP recipients per community roughly followed the proportions reported in the community demographic data presented in Table 1; participation was highest in Community B (33%), followed by Community C (25%) and Community A (13%).

Shopping habits

In general, participants reported following a standard routine when they shopped at the grocery store. Many used a list to make sure important items weren't forgotten, others used the store's advertisements to select products that were on sale, and some decided what they were going to buy based on whatever stood out to them when they arrived. One participant described her usual routine like this:

"I usually make a list at home of what I need, and you might see something that you'll pick up, because I can go in the store to get two or three things on my list, and come out with a cart-full. I just really see things that I didn't think I was going to buy…" (Female, African American, ≥75 yrs, Community C)

Participants were asked to use a Likert scale from 1 (not at all important) to 5 (extremely important) to rate the importance of a variety of factors that may influence their decision-making around food purchases generally. Quality was the most important determinant, averaging 4.9 on the 5-point scale. Convenience was the second most important factor (4.6), followed by taste (4.5), price (4.4), and health (4.1). "Because it's good for your local economy" and "because it's good for the environment" both scored an average of 3.7. "Because of personal or family tradition" scored the lowest, averaging only 2.6.

We did not formally assess food security status; however, when asked whether they felt that they typically ate the way they wanted to, most participants said yes. When asked whether

they would eat differently if they had more money available for food, many respondents said that they probably would not. Those who replied yes typically spoke of increasing the quality of their food (e.g., buying more expensive cuts of meat) or going out to restaurants more. No participants, including those with the lowest household incomes, volunteered information suggesting that they were experiencing a high level of food insecurity.

Perceptions of "local"

Comparing Participants were asked to provide their own definitions of "local" food; to describe their experiences with it, including early life or current exposure to farms, gardens, farmers' markets, and farm stands; and their ideas about the potential importance of local food to themselves or their communities.

Defining "local" food. Respondents presented a variety of definitions for "local" food, but there were several common themes. Most cited political boundaries, the most common being food that was produced within their county of residence (n=9; 47%). Six people (32%) felt that anything grown within the state of North Carolina could be considered local. Others used geographic distances to define "local," including "4-5 miles," "a 20 mile radius," and "within 100 miles." Some reported an initial definition that was personally relevant, but they assumed that items labeled "local" in a grocery store would have a different, broader definition. This theme is illustrated in the following exchange:

Participant: *"[Blinded] County is what I would consider, if you say local, I would think just [blinded] County, period."*

Interviewer: *"And no surrounding area or counties?"*

Participant: *"Not when you say local, not then."*

Interviewer: *"If you saw something labeled 'local' at the grocery store… have you ever seen that at [Store C]?"*

Participant: *"Yeah."*

Interviewer: *"So what do you think it means when you see it? The same? Or do you have a different impression?"*

Participant: *"I kind of have a different impression. I mean, I've been around [Community C], and I've never seen some of that stuff grown around here, so it's like when they say 'local,' they must not mean just here, it's got to be around, maybe they're talking about the East Coast of North Carolina, or something like that, because there's not too many farmers still left around here."* (Female, African American, 25-34 yrs, Community C)

Another participant expressed his uncertainty about how "local" should be defined: *"I would think right around in the area, and sometimes I do wonder how local is local."* (Male, White, 45-54 yrs, Community A)

One person indicated that the speed with which food can be transported to his area is an important defining attribute of "local" food:

"If it was local, I would say from right here in the county, or close around in the state. Close to the vicinity of [blinded] County. Not miles away, you know, where it takes a couple of days to get here. I mean, you can get it here in a day, or half a day or something like that is what I mean 'locally.'" (Male, African American, 55-64 yrs, Community C)

Other participants used feelings to define "local" food rather than geographic or political boundaries. This theme is exemplified by the following exchange:

Interviewer: *"When I say 'local foods,' what does that make you think of?"*

Participant: *"Community."*

Interviewer: *"Community. Talk a little bit more about that."*

Participant: *"Local farmers, produce, vegetables, I'd even like to find a place where I could find fresh eggs opposed to the store-bought, but I don't know of any of that. Basically that kind of stuff. I mean, I would enjoy it very much."*

Interviewer: *"Why is that?"*

Participant: *"Because I think homegrown is better any day of the week than store bought."*

Interviewer: *"What makes it better?"*

Participant: *"The love that goes into it. Because they have to love being a farmer, and growing, or they wouldn't do it."*

Interviewer: *"How does that benefit you, as the consumer?"*

Participant: *"Lifts my spirits, makes me feel good. Because I'm helping them, so all in all, everybody wins."* (Female, White, 65-74 yrs, Community B)

Experiences with local food. Many of our participants talked about their experiences growing up with family farms or gardens. "Nostalgia" emerged as a salient theme. Most believed that early experiences they had with "homegrown" foods had shaped their eating habits into adulthood. One participant who grew up helping with her family's farm said,

"I think it probably has [shaped eating habits] because, you know, it was a tobacco farm, but we had a garden and grew our vegetables, so you know, I think you're just, I'm probably kind of looking for that freshness, or for that taste, and it was just different from what you grow than what you get in the store." (Female, White, 45-54 yrs, Community A)

In response to her feelings about local food, another participant said,

"I think it's better. Not knocking any products on the market, because all of them are good, I just prefer that you bite into a tomato, and you know it's homegrown, and there's just something totally different about it. And that could be because when I was growing up, my mother had a huge garden, and that's what I was used to." (Female, White, 65-74 yrs, Community B)

Roadside farm stands that sell fresh produce are prevalent in Community A, and many participants reported buying from them. This community feature seemed to influence how some residents perceive local food. When one participant was asked what she would think a "local" label meant within a grocery store, she replied,

"I would think that it meant it was grown in this area. Now, if I was at the produce stand, I would more think it was this immediate area. In the grocery store, I might think, 'okay, that maybe means the state,' or to me, I think that might still be considered local. […] I think I would still be okay with buying it. Like I said, my problem is when it comes from so far away, I mean, I really know nothing about it. So, I don't know, I think that, yeah, the state, I would buy it. I would still consider it local." (Female, White, 45-54 yrs, Community A)

Nearly half of our participants (n=10) spoke about food preservation, usually in reference to canning or freezing excess produce from their own home gardens or from what they receive from friends, family, and neighbors. Often, these activities were linked with memories of family.

Importance of local food. We asked interviewees to discuss whether they thought local foods were important for any reason. The themes of "community", "economy," and "supporting local farmers" emerged from many of our interviews, as illustrated by the following quotes:

"Lots of people like the idea of fresh vegetables. Most people want to help the farmers." (Male, White, 55-64 yrs, Community A)

"I think it's very important, of course there's money that's staying more in our local area, then it's going to be helpful for our economy." (Female, White, 45-54 yrs, Community A)

"There again, you help farmers, they make money, and that in turn gives them more money to spend in the community, so everybody wins." (Female, White, 65-74 yrs, Community B)

"For the community, I think so. Not only is it going to help the community, but it's also going to help the people that are growing. So that maybe they'll branch out and do more, that's how I look at it. […] Because this town needs a, like, you want it to have something, like you want it to have a name known for doing something, not just a place on a map." (Female, African American, 25-34 yrs, Community C)

Other participants associated local food with personal benefits, including greater transparency in production methods, fewer perceived harmful chemicals, and better flavor. The following quotes exemplify these ideas:

"Just, we tend to trust more closer by because you know how they're grown, and you know how the people are, so you don't know what's coming out of Georgia, and out of Florida... I've heard people say a lot of stuff about the way the food is gathered, about the strawberries being picked and stuff." (Male, White, 45-54 yrs, Community A)

"I like it [local food] because you might know that there's nothing on it that can hurt you, they might take care of it more, might not have as much of fertilizer and stuff that'll hurt you." (Female, White, 25-34 yrs, Community B)

"… to a certain extent, it's because when you live in a certain area, and it's what you usually are used to eating or whatever, you know because you can get something from other places, and they'll say 'this is a sweet potato,' but it looks different from a sweet potato that

you're used to seeing in this area, and you're like, 'okay it is, but what kind is it?' There is a difference in the taste, and how they look, stuff like that. It would go for, for me, it would just be how it tastes. And I'm not against trying different things, it's just that, you know and you got your mind set about this is what it's supposed to look like, or this is what it's supposed to taste like, so if you're in the area, you get used to what smells, and tastes, so you're just used to that." (Female, African American, 45-54 yrs, Community A)

Participants were then asked specifically about their perceptions of local foods being sold in the grocery store. Trust and transparency were common themes that arose here, though positive feelings toward genuinely local produce generally prevailed. One participant said,

"I'd have to kind of feel that out to see if I trusted what they were doing. It's like the, there's an ad on the radio I hear, and it's like, 'Oh yes, I'm local, I live right here!' So, I don't know. You've always got to look out for the scam I guess." (Male, White, 45-54 yrs, Community A)

When asked what might make him trust it, he replied,

"*Probably if I talked to a few people, and they might know somebody who had something in there, or if they had a sign that said 'grown locally at such and such farm' that gave me the business number where I could at least call and say, 'hey, you guys have got stuff up here at the [Store A], blah, blah, blah,' some way to check it out, I guess."*

This participant was not alone in his mistrust of food retailer advertising around "local." Another respondent reported,

"I kind of have mixed feelings. […] Sometimes I'm thinking that if I buy [food advertised as local], it's going to help around here, but then in the back of my mind, I'm thinking, 'that's just a gimmick to get me to buy it because it's not really locally grown.' And plus, anybody that

really has had a homegrown tomato, it tastes different than a store tomato. So I might buy tomatoes and like, this isn't locally grown, this is grown somewhere else, so that's kind of how I feel..." (Female, African American, 25-34 yrs, Community C)

When this respondent was asked how she would feel if she could know for sure that certain products were grown in her community, she replied, *"I probably would buy it more, just thinking it would help the economy around here, I probably would."*

Interviewees were asked if they thought a certain type of person buys local food. Five of 13 respondents believed that all kinds of people like to buy local food, and an additional five people thought that older people are generally more interested in local food. These participants felt that the older generation values local food because they have more time to prepare it, they are used to it because it's what they grew up with, and because they trust it more than non-locally produced foods. One of these five respondents, a woman aged 25-34 yrs, mentioned that younger people also like local food because "it's sort of a trend." An additional three respondents believed that "people who are more into organic," "health conscious people and farmers," and "people that can afford it" describe the types of people who like to buy local food.

Choice experiment

Interviewees In a simple choice experiment, participants were asked to imagine that they were in the produce section of the grocery store and looking at an item they wanted to buy (strawberries were used as a common example). There was a local version of the item and a nonlocal version, but all other attributes were equal. They were asked which version they would buy. Of 20 respondents, 18 responded that they would preferentially select the local product first. Two participants said they would look at quality first and had no preferences based on localness.

Next, they were asked which item they would select if the local version was slightly more expensive (the most commonly used example was $3.00 vs. $3.25). Nine people (45%) were willing to pay slightly more for the local product; some reported specific limits for how much more, such as 5%, 25%, or "up to a dollar" more. Others were willing to pay "a reasonable amount" more but were unable to give a specific upper limit. One person stated that she would be willing to pay more for the local product "if I knew what local meant," indicating the importance of transparency in labeling. An additional eight (36%) people responded that they would be willing to pay a higher price for whichever product appeared to be of higher quality, regardless of its origin.

In response to how much more one participant might be willing to pay for a local product, she responded:

"I don't know, I think that would probably be a call that I'd make in the store. As long as it was within range, and it fit into my budget, that would be the bottom line as far as price, but I would be willing to pay a little more for something local." (Female, White, 45-54 yrs, Community A)

When asked <u>why</u> she would be willing to pay more for local, the same respondent said:

"I don't know, I just think it's more natural, more fresh. It just, like, when I'm cooking, I try to keep everything to the most natural form of it. That's why I don't like to buy processed stuff. So there's something about that in my head, maybe, about local things. If I know someone from here grew it, I just feel I can trust it better, and it's fresher, it hasn't spent days on a truck getting ripe while it's not actually on the vine, I don't like that."

Another respondent explained his willingness to pay more for quality and localness by saying, *"So it all depends on the quality, and like I said, if it's local, I like to contribute back to*

the, give something back to them. That's the only right thing to do." (Male, African American, 35-44 yrs, Community C)

Local food promotion ideas

Accurate labeling and transparency in local food sourcing was the second most commonly suggested strategy for encouraging shoppers to buy local produce from grocery stores. Eight of 19 suggestions (42%) focused on transparency with regard to where products came from and the farmers who grew them. The most commonly mentioned strategy was basic advertising, which 14 people (74%) suggested. Other ideas included competitive pricing of local products and attractive displays within the produce section. A selection of specific ideas are presented below:

"I guess promote it, advertise it, put it in their flyer. I have a loyalty card for them. I think that emails, I get emails on the weekly specials, so include that there. Maybe do a special event on a Saturday with, featuring the local folks, and maybe doing some demos." (Female, White, 45-54 yrs, Community A)

"Probably advertise that they're going to do it. I think advertisement makes a big difference. If you know they're going to sell the local stuff, then you're bound to go there and buy it." (Female, White, 65-74 yrs, Community B)

"Like a local section, produce, have a section that's just local produce, and vegetables, and so that way, everybody knows that it's local. Instead of having everything mixed in, in their own groups, just have one big group, and it's… I would think people would be more likely to pick out of that group compared to everything spaced out, having to look for a local tag." (Male, White, 25-34 yrs, Community B)

"I think they would kind of, for me it'll be advertised more, but I think it would be to show your customers that they're actually helping. Like, this is actually local, and this is where the money is actually going to. I think that would help out a lot." (Female, African American, 25-34 yrs, Community C)

"I guess they could advertise more locally grown, or maybe they can have some of the people who it is, that it belongs to, to be out here with some of their products. Then they'll say, 'well this is, yeah that's Miss So-and-so's peaches and apples.' I think that would help them." (Female, African American, 55-64 yrs, Community C)

"Just advertise, advertise, just have some sort of comparison chart, or graph of some sort to show the difference in locally grown food versus non locally grown food. Just some sort of chart, some sort of comparison to show people the difference. […] I guess the time it took to grow, whether it was grown in a greenhouse or not, the chemicals that were used to help the growing process..." (Male, African American, 18-24 yrs, Community C)

Discussion

This study adds new insights into perceptions and preferences around the idea of "local" food in rural North Carolina. A primary objective was to understand how frequent shoppers at a lower-cost food retailer defined the term "local." Unlike the term "organic," there is no official definition or set of regulations that govern "local" food labels, making it difficult for consumers to identify local foods and trust that products labeled "local" fulfill their expectations.[63,67] Trust and transparency around foods labeled "local" in the grocery store were important issues that emerged among our study sample.

To our knowledge, this is the first study to use qualitative methods to investigate the perceptions and values around locally grown foods with a specifically rural and lower-SES population in the US. Compared to existing literature, participants in this study revealed similar reasons for their positive associations with local food. Individual-level factors included preferences for freshness, quality, health benefits, and food safety. Community-level factors indicated ideals around supporting the local economy, the community, and neighboring farmers.[43–47]

Studies have found that although many people believe that local products are of greater value than nonlocal alternatives, they still may not be willing to pay higher prices.[43,48] A majority of survey respondents in one study (61%) indicated that lower prices would encourage them to purchase more locally produced foods.[43] Additional studies, however, have found that some people are willing to pay extra for food that they believe supports health, social, and environmental benefits.[43,47,49] Participants in our study provided a similar narrative; most would prefer to purchase local products if all other attributes are equal, but quality and price are highly influential attributes as well.

Various demographic characteristics are associated with local food purchasing behavior in the literature. Women tend to be slightly more likely to purchase local food than men,[43,50] which may be due to the finding that women are more likely to be impacted by social influences.[51] Consumers who report having a connection to agriculture or live in a rural area, as well as individuals with higher education and income levels, may be more likely to purchase local foods.[52] A previous survey conducted in North Carolina found that White families, lower-income families, families in rural areas, families with children who ate 5 or more servings of vegetables per day, and families with children in poor health were more likely to purchase local

food than others.[53] However, additional studies report that demographic factors are inconsistent in predicting the likelihood of local food purchasing, and that "attitudinal factors" (e.g., "liking to cook") are more strongly predictive.[52,54,55,67]

Household structure and other demographic characteristics did not appear to have a noticeable impact on how participants defined or spoke about local food in the present study. Participants with higher household incomes tended to cite fewer financial barriers with regard to food purchasing, but this was not the case across the board. Respondents tended to talk about making adjustments to food quality, rather than quantity, in response to changes in their financial status. With regard to local food purchasing, preferences again did not seem to be overtly linked with household income, SNAP participation, or educational attainment. Other studies on local food preferences have found that older, wealthier, and rural-dwelling people expressed the most positive attitudes and preferences for local food.[67] Interestingly, although our sample did not necessarily lead to the same conclusion, our participants seemed to hold similar beliefs about the types of people who buy local food.

This study was undertaken, in part, to provide formative data for the development of local-food-based healthy purchasing interventions in our partner grocery stores. Participants were asked how they thought a grocery store should encourage shoppers to purchase more fresh, local produce. Again reflecting a desire for greater knowledge and transparency, most suggested basic advertising and providing information about the specific origins of the products. This strategy aligns well with the finding that many participants in our study feel strongly about supporting farmers in their area, even if it means paying slightly more.

People seemed to conceptualize "local food" differently depending on the context given. For example, when one participant spoke about buying local food directly from a producer or

farmers' market, she perceived it to be cheap and accessible; however, when she later spoke about local food in the grocery store, she assumed that it would be more expensive, as if it then becomes "trendy" and more costly. This perception was reflected across several interviews in this study and others[67] and should be taken into account when designing future store-based, local food promotional strategies.

Through our analysis, several unanticipated themes emerged, including concepts like "nostalgia" and "community ties." These codes revealed a deeper narrative around local foods in our three communities. Beyond simply informing future intervention development, the data helped to elucidate patterns that exist in the grocery shopping and local food purchasing behaviors of rural and low-SES North Carolinians. The iterative, inductive analysis of our IDI data contributes new insights to the consumer food purchasing behavior and local food bodies of literature.

Our findings suggest an affinity for local foods among rural North Carolinian residents who are frequent shoppers at lower-cost food retailers. Many expressed a willingness to pay slightly more for local foods that they could trust and for foods that evoked feelings of connectedness and nostalgia. Contributing to their own economy and reciprocating the commitment they perceive from local farmers were important dimensions of participating in their local food system. If they wish to participate effectively in the local food retail sector, grocers should be mindful of the deep sociocultural framework through which their customers view local food.

Table 4.1. Community demographics[68,69]

Recruitment community	Urban/rural classification	Population	% Families below poverty level	% Individuals below poverty level	Median household income ($)	% Households receiving SNAP
A	Rural	1,477	11.6%	16.7%	33,988 (±4,437)	12.3%
B	Rural	1,692	26.1%	29.8%	30,135 (±6,560)	24.4%
C	Rural	862	7.5%	15.6%	34,088 (±8,449)	20.5%

Table 4.2. Participant demographics

Demographic characteristics	Community A (N=8)	Community B (N=6)	Community C (N=8)
Gender[1]			
Female	5 (63%)	4 (67%)	4 (50%)
Male	3 (38%)	2 (33%)	4 (50%)
Age			
18-24 y	0 (0%)	0 (0%)	1 (13%)
25-34 y	0 (0%)	3 (50%)	1 (13%)
35-44 y	0 (0%)	0 (0%)	1 (13%)
45-54 y	6 (75%)	0 (0%)	0 (0%)
55-64 y	1 (13%)	2 (33%)	2 (25%)
65-74 y	0 (0%)	1 (17%)	1 (13%)
≥75 y	1 (13%)	0 (0%)	2 (25%)
Race/ethnicity[2]			
Black or African American	1 (13%)	0 (0%)	8 (100%)
White	7 (88%)	6 (100%)	0 (0%)
Educational attainment[3]			
<High school diploma	0 (0%)	0 (0%)	1 (13%)
High school diploma or equivalent	2 (25%)	4 (67%)	2 (25%)
Trade/technical/vocational training	3 (38%)	0 (0%)	2 (25%)
Associate's degree	0 (0%)	0 (0%)	2 (25%)
Bachelor's degree	3 (38%)	1 (17%)	1 (13%)
Master's degree	0 (0%)	1 (17%)	0 (0%)
Approximate household income			
<$20,000	0 (0%)	3 (50%)	2 (25%)
$20,000 - $34,999	2 (25%)	1 (17%)	2 (25%)
$35,000 - $49,999	1 (13%)	0 (0%)	2 (25%)
$50,000 - $74,999	2 (25%)	0 (0%)	1 (13%)
$75,000 - $99,999	2 (25%)	1 (17%)	0 (0%)
$100,000 - $149,999	0 (0%)	0 (0%)	1 (13%)
≥$150,000	0 (0%)	1 (17%)	0 (0%)
Prefer not to answer	1 (13%)	0 (0%)	0 (0%)
Participation in WIC/SNAP			
Yes	1 (13%)	2 (33%)	2 (25%)
No	7 (88%)	4 (67%)	6 (75%)

[1]No participants chose to self-identify gender
[2]No participants reported Asian, Hispanic/Latino, Native American/Alaska Native, or Hawaiian/Pacific Islander race/ethnicity
[3]No participants reported a professional or doctoral degree

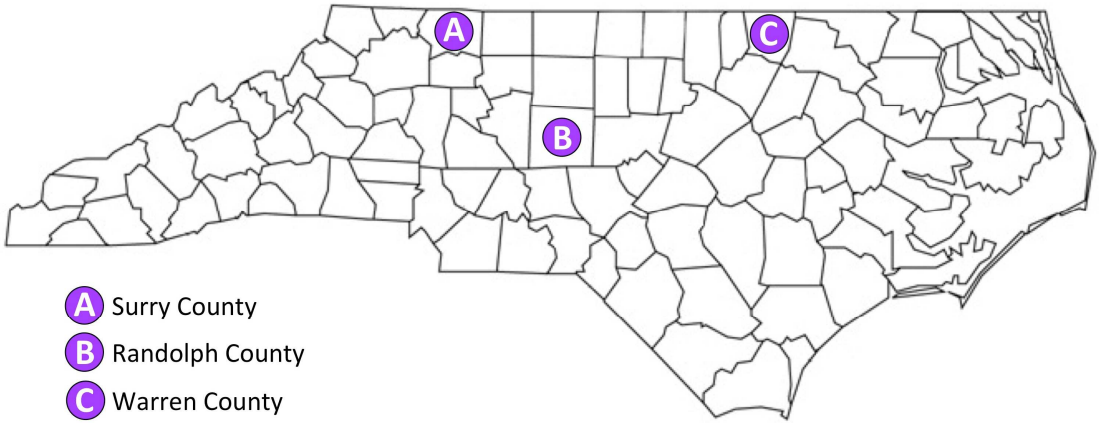

Figure 4.1. Map of recruitment sites by county in North Carolina

CHAPTER V: DESIGN AND PROCESS EVALUATION OF A PILOT LOCAL-FOOD-BASED INTERVENTION PROGRAM WITH TWO GROCERY STORES IN RURAL NORTH CAROLINA

Overview

Background: Rural populations in the United States have disproportionately high levels of obesity and other diet-related chronic diseases, which is often linked with lower socio-economic status (SES) and reduced access to affordable, healthful foods. Healthy food access is a key focus of efforts to reduce disparities in diet-related chronic diseases, and food retail environments are a promising setting for this work. A novel method for improving healthy food purchasing may include capitalizing on the current trend toward favoring locally produced foods. There is evidence associating local food purchasing with healthier eating behaviors, but little is known about whether lower-SES and rural consumers have positive associations with local food and would preferentially buy it in the grocery store context.

Objective: To describe the design and implementation of two local food promotion strategies to increase healthy food purchasing in retail outlets designed for lower-income consumers in rural North Carolina.

Methods: We partnered with a grocery retailer located in rural, lower-SES communities in North Carolina. Two distinct local-food-based intervention strategies were developed using findings from formative work and existing literature. The store managers worked with area farmers to source fresh, local produce for the duration of the intervention phase. In-store consumer intercept surveys (n=67) and unannounced store visits (n=7) provided insights into program implementation and acceptability.

Results: The intervention phase lasted the duration of the stores' ability to source local produce (8 wks and 6 wks). One store implemented the intervention materials with high fidelity, while the other implemented the intervention with moderate and diminishing fidelity. Few shoppers reported noticing the intervention materials in either store, but 88% of respondents reported a preference for local foods, and 70% reported a desire to purchase local food on their next shopping trip. Prices for local and nonlocal produce items were kept equal, thus eliminating the most commonly cited perceived barrier to purchasing.

Conclusions: Findings from this study indicate that promotion of local food is acceptable to both consumers and retailers in rural, lower-SES communities. However, further work is required to identify the effectiveness of different marketing approaches and the impact on food purchasing.

Background

Rural populations in the United States have disproportionately high levels of obesity and other diet-related chronic diseases.[70–72] Communities of color also experience multiple health disparities.[73] A primary goal of Healthy People 2020 is to "achieve health equity, eliminate disparities, and improve the health of all groups," including in rural areas and communities of color.[74] The high rates of diet-related chronic disease and obesity in rural communities are often linked with lower socio-economic status (SES) and reduced access to affordable, healthful foods.[75] Environmental determinants of health, including healthy food access, are a key focus of efforts to reduce disparities in diet-related chronic diseases.[7,76]

Most food purchases in the US occur in grocery stores and supermarkets,[10,11] which makes them a natural setting for interventions aimed at improving healthy food purchasing. Food

retail-based nutrition interventions typically focus on encouraging consumers to purchase healthier food, and a variety of strategies have been tested with mixed results.[12] As we have learned from decades of public health messages telling us to "eat better," determinants beyond knowledge alone influence individual dietary behaviors.[16,32,33] In fact, consumers may grow weary of the healthy eating messages or even perceive foods labeled "healthy" to taste bad.[34] Retail-based approaches have focused on changing the retail environment through increasing the availability of healthy foods and making changes to the layout or structural components of the store in a manner to encourage healthier food choices.[33,35–38]

A novel method for improving healthy food purchasing may include capitalizing on the current trend toward favoring locally produced foods in a way that combines increased availability of healthy foods with changes to the physical store environment. There is evidence associating local food purchasing with healthier eating behaviors.[39,59,60] However, little is known about whether lower-SES and rural consumers, who face greater resource constraints, have positive associations with local food and would preferentially buy it in the grocery store context, potentially increasing their purchasing of fresh fruits and vegetables. In this study, we designed and implemented two retail-based local food promotion strategies to increase healthy food purchasing in two retail outlets targeting lower-income consumers.

Methods

Intervention design

This pilot intervention trial was conducted as part of a larger project aiming to bring locally produced foods into mainstream markets in North Carolina. Our intervention and comparison stores were recruited through a partnership with a regional food retail chain. The food retail

partner is composed of a standard grocery store chain and its lower-priced sister stores. The lower-priced stores are primarily located in rural communities in North Carolina and served as the intervention and comparison stores for this study.

Three intervention and three roughly matched comparison stores were selected to participate in this study in collaboration with our corporate retail partner (Figure 5.1). Stores were selected for their ability to source local foods and the cooperativeness of the store managers. Comparison stores were approximately matched based on store size, age, and location. Managers from each intervention store consented to collaboration with the research team. A key requirement for eligibility was the agreement to stock at least three different types of local produce in the store at all times during the intervention period (not applicable to comparison stores). Shortly before initiation of the intervention phase of this project, the local food supplier to Store A went out of business. Unable to put new local sourcing contracts into place in time, Store A was excluded from the intervention phase, and its comparison store was no longer needed. No other stores were equipped to serve as a third intervention store at that time.

We developed and implemented two distinct store-based intervention strategies during July and August 2015. Store B was able to source local produce for approximately 8 weeks, while Store C received local produce deliveries for only 6 weeks. Community demographics are presented in Table 5.1.

The interventions were developed based on formative work conducted across the three participating communities (see Chapter 4) and findings from existing literature. Detailed descriptions of each targeted construct are below. Our in-depth interviews with shoppers revealed that knowledge about local produce availability and transparency as to its sourcing were believed to be important motivators for purchasing local foods. Many participants mentioned that

they would like to support farmers in their community, indicating that *reciprocity* (the feeling that one must return a favor) may also be a salient motivator.[17,18] The literature suggests that consumers are strongly motivated by the behavior of their peers,[17,37,77–79] and that *social proof* (the tendency to adopt the preferences or behaviors of others) is a compelling initiator of new behaviors like local food purchasing.[18,19] Thus, two distinct intervention strategies were developed. The first strategy employed social proof and elements of cross-selling (the suggestion to buy an additional item when a first item is selected)[21] with generic "local" labeling (no specific farmer mentioned). The second strategy emphasized who produced the food and where, using messaging to promote reciprocity. A variety of signs, stickers, and recipes were created for the two strategies (Table 5.2). We aimed to evaluate whether these messaging styles were effective at encouraging the purchase of locally grown fruits and vegetables.

Description of targeted constructs. Three primary constructs and one marketing strategy guided the interventions. These included knowledge, reciprocity, social proof, and cross-selling.

In-depth interviews with consumers asked about the factors that would motivate shoppers to preferentially purchase local produce (see Chapter 4). The most commonly suggested motivator was to advertise which produce items were local and which farmers produced them, so that consumers could make use of this *knowledge* when making purchasing decisions. Many participants indicated that they would like to support local farmers, as they perform an important function in society.

In contrast to the beliefs of our interviewees, the literature suggests that many of the decisions we make in the grocery store are not based on knowledge or beliefs, but are instead made under "mindless" conditions and with low self-control.[17,80–82] Rather than trying to increase the self-control and mindfulness of every individual, researchers suggest taking advantage of the

external environmental cues, or heuristics, individuals use to help them quickly make decisions. External influence heuristics include *reciprocity* and *social proof*.[17,18,83]

Cross-selling is a commonly used marketing strategy that aims to sell an additional product to an existing customer.[21] A well-known use of this strategy is by the online retailer Amazon.com. When a shopper places an item in their virtual shopping cart, Amazon informs them about products "frequently bought with" their selected item and that "customers who shopped for [selected item] also shopped for" other products. The later recommendation also brings in an element of social proof, potentially strengthening the influence of the technique.

Data collection

Two tools were used to collect process evaluation data regarding implementation of the intervention strategies: an in-store intercept survey and a store observation form. Data collectors were trained to: administer the in-store intercept surveys; perform the store observations; and take detailed field notes about the fidelity of the intervention materials, store manager comments, and the availability and placement of local food. Data collection occurred at each intervention store approximately every two weeks, for a total of 7 visits throughout the intervention phase (4 in Store B and 3 in Store C). All store visits were unannounced.

In-store intercept surveys. Data collectors stood at a table placed near the exit of the store for approximately 1-2 hours, and shoppers were asked if they would like to complete a brief, iPad-based survey about their shopping experience as they were leaving the checkout line with their purchases. They were offered a free fresh produce item upon survey completion in gratitude for their time. The survey asked about signs or promotions they may have seen throughout the store, whether any signs they saw were influential in choosing what to buy, whether they were

shopping alone or with others, whether they are the primary household shopper, what store(s) they shop most frequently for groceries, household demographic characteristics, and several questions about local food availability and purchasing preferences.

Store observation form and field notes. The store observation form was designed to assess fidelity of intervention implementation by evaluating accurate placement of signs, the visual quality of intervention materials (e.g., whether signs had degraded over time), the restocking of materials like stickers by the cash registers, the legibility and accuracy of price and place of origin signs, and the visibility of all materials. Data collectors noted all types of stocked local produce, the visual appeal of the displays, and other potentially informative observations that may have contributed to the effectiveness of the interventions.

Field notes included reports from store managers about local produce sourcing, customer feedback they may have received, and any problems or positive experiences with the intervention materials. A 15-minute observation of customers in the produce area was conducted at each store visit. Data collectors noted the number of shoppers who moved through the area, whether they interacted with or seemed to notice the intervention materials, and whether they selected any of the promoted local produce.

Data management and analysis

In-store intercept surveys were collected using the offline Qualtrics software application (Qualtrics, version 2015, Provo, UT, USA) on iPads. Stata statistical software (version 13.1, StataCorp, College Station, TX, USA) was used to calculate summary statistics collected from the surveys. The store observation tools were summarized by hand by the lead researcher (BNH).

The Institutional Review Board of the University of North Carolina at Chapel Hill approved all aspects of the study design.

Results

Stocking of local produce

Both stores successfully began sourcing fresh produce from local farmers and maintained more than the minimum number (3) of different produce items required for the duration of the intervention period. Store C typically had around 4 types of local produce, while Store B often had as many as 10 types. Available local produce items during the intervention phase included two types of watermelons, cantaloupe, red tomatoes, green tomatoes, jalapeño peppers, white onions, red onions, sweet potatoes, cabbage, two types of cucumbers, zucchini, and yellow squash.

Store B kept the local produce consolidated in a centrally located, visually appealing display that was visible to customers as they walked in the door. Store C placed most of the local produce items in the refrigerated display case under the misting mechanism. Local produce was interspersed with nonlocal produce and was not immediately visible upon entry into the store or the produce area.

Fidelity of intervention materials placement

The initial installation of intervention materials was planned to coincide with the first deliveries of local produce to the stores. Study staff worked with the store managers to place signs in appropriate locations. The cross-selling signs and recipes delivered to Store C were

produce-dependent and required more maintenance throughout the intervention period as the availability of certain local produce items changed.

According to the store observation tool, Store B consistently maintained intervention signage (Figure 5.2). The local produce items changed due to seasonality across the intervention period, but the signs were not produce-specific and did not require updating (unlike in Store C, as described later). By the end of the 8-wk intervention period, Store B had retained nearly all of the originally placed signs. Two signs that had been placed in stands on the floor had been removed. All shelf displays were intact and had not noticeably degraded. The only observed instances of unlabeled local produce items (n=3) were for products that had recently been delivered and were not located in the primary local produce display area. This happened for jalapeño peppers, which were located in the refrigerated produce case, for tomatoes, which were placed on the side of the local produce display, and for watermelons, which were in their own large crates. In all cases, intervention signs were placed by these items at the next store observation visit. Prices for local produce items only were written on miniature chalkboard signs affixed with clothespins to further differentiate them from their nonlocal counterparts. These signs were occasionally smudged and illegible, but store managers were quick to fix them when notified.

The managers at Store B reported ease of local produce sourcing, a positive relationship with the farmer they were working with, and positive reactions from customers. They highlighted the importance of speaking with customers to let them know about the farmer and how good his products were. They initiated repeated sampling events in the store to allow customers to taste various local produce items and stated that many customers chose to buy the

product they tasted. Data collector field notes did not reflect any reported challenges from the store managers.

Store C received multiple versions of the cross-selling signs and recipe pads to accommodate the changing seasonal produce across the intervention period. The produce manager agreed to update the materials in accordance with produce availability. At each store observation, data collectors noted that the signs and recipe pads were placed above the refrigerated produce case and not necessarily in correspondence with the local produce items (Figure 5.3). Further, signs were not placed on new local produce items that were located elsewhere throughout the produce section. For example, cantaloupes and watermelons were displayed in large crates away from the refrigerated display case and were not given any form of local labeling. Data collectors worked with the produce manager and store staff to install intervention materials in these locations, but compliance was limited. Stickers with the "I buy local!" social proof messaging were placed at the registers for customers to take at checkout. Data collectors noted that the stickers needed to be replenished at the second and third store observation visits. Cashiers reported that the stickers were very popular with customers of all ages. The grocery cart signs remained in place throughout the intervention period. They were observed in use in the store, and customers stated that they liked the image and "I buy local!" messaging. Recipe pads were checked at each store visit to determine whether customers had been tearing off recipes to take home. Few recipes were taken from each of the recipe pads. The recipes were intended to change with the cross-selling signs as produce availability changed, but this was not always done; signs and recipes at times promoted produce items that were no longer available in the store. In all instances where a lack of fidelity was observed with regard to intervention materials placement, the produce manager was notified and asked to update

materials. When the produce manager was unavailable, other store staff members were notified. Upon returning to the store at the next observation visit, it appeared that requests had often not been addressed. For materials that remained in place throughout the intervention period, they retained their quality and legibility over time.

The produce manager was our primary partner in implementing the intervention at Store C. She was not always available when data collectors visited the store, and other staff members would agree to relay messages but not to take on intervention activities like sign placement. When data collectors were able to speak with the produce manager, she reported feeling extremely busy and indicated that keeping up with intervention materials was fine, but not a top priority. She stated that the farmer was cooperative and responsive to her orders, but certain items she expected to receive from him were not ultimately available due to extreme weather. Because of this, some of the produce-based intervention materials (cross-selling signs and recipe pads) were no longer relevant and she did not display them. The produce manager did not think most shoppers had noticed the intervention materials, and she did not report speaking to them specifically about local produce availability.

Summary of store observations

To characterize the observations data collectors made throughout the intervention period, we here present a typical set of observations from each store:

During the store observation for Store B on the Wednesday afternoon of July 22nd, the data collector noted that while some shoppers were looking at the intervention materials, others would "*pick out the non-local tomatoes next to the local ones without seeming to notice there was a difference*," despite clear labeling. The data collector also recorded that one person saw the

signs and selected produce from the display, another looked at the signs and display and then moved on without selecting local produce, and another group of shoppers looked at everything very carefully. Overall, interaction with the intervention signage was limited. During the 15-minute observation period, there were a total of 14 discreet people or groups shopping in the produce section. Of those, only 2 selected local items.

During one of the observations in Store C (Wednesday, midday, July 15th), there were 9 discreet shoppers or groups in the produce section. Of these, only 1 person stopped to look carefully at the intervention materials, but they did not take a recipe or select any of the local produce. At that time of day, the shoppers appeared to be primarily older in age. The data collector noted that the local signage was placed above the produce case in a way that made it ambiguous as to which produce was actually local. Most shoppers during this observation period were choosing bananas, cucumbers, sacks of potatoes, and little else (all nonlocal produce items). A "grown in Mexico" sign was still present next to the zucchini, despite confirmation that they were from the local farmer.

Results from intercept surveys

Demographics. Sixty-seven surveys were completed. Most respondents were women over the age of 45 years (Table 5.3). Respondents in Store B were predominantly White, and respondents in Store C were primarily Black/African American. Few respondents identified as Hispanic/Latino, which was partially due to a lack of Spanish language survey capability. Across both stores, high school diploma or equivalent was the most common level of educational attainment for respondents themselves as well as for the other adults in their households. Of

respondents who felt comfortable reporting approximate household income, the largest proportion earned less than $20,000 per year (24% in Store B; 24% in Store C).

Shopping experience and noticeability of intervention materials. When asked if they were at the store for a "big" shopping trip or just needed to pick up a few things, 94% of respondents said they only needed a few things. Of 67 respondents, almost half (49%) reported purchasing items from the produce section. This was the most frequently shopped section, followed by meat/deli (45%), soft drinks/sodas (40%), dairy/eggs (39%), snacks (e.g., chips, crackers, pretzels) (30%), and frozen meals (e.g., pizza, dinners, breakfast items) (22%).

More than half (57%) of respondents reported noticing new displays in the store, while 43% said the store "looked the same as last month." Of the 38 people who noticed new displays, 42% (16 people) said they were located in the produce section. Of those respondents, only 4 (2 people per store) reported seeing new signs about locally grown produce. Eleven shoppers (29%) noticed sale signs, and 1 person (6%) thought the signs were advertising a store contest.

Of the 33 people who purchased something from the produce section, 27% stated that signs or displays in that area influenced them to buy an item they otherwise wouldn't have (3 in Store B; 6 in Store C). Of these 9 individuals, 7 were influenced to buy produce that was on sale, 2 were influenced to buy produce that was locally grown (both in Store C), and 3 reported "other." Across both stores, 56 people (84%) stated that they do typically notice advertisements, promotional displays, signs, or other marketing materials while shopping.

Local food purchasing attitudes and behaviors. When asked about the availability of local produce in the stores, 61% of respondents in Store B said their store "usually seemed to" have produce from local farmers, while 5% thought they did not, and 34% were unsure. In Store C, 55% of shoppers thought their store usually had local produce, 0% thought they did not, and

45% were unsure. When asked, "When shopping at Just Save, do you prefer to buy locally grown foods when they're available?" 88% said yes, 0% said no, and 12% selected "I don't care if it's local. I buy whichever one looks better." When asked, "Do you intend to buy locally grown produce the next time you shop at Just Save?" 1 person responded, "No, I definitely won't buy any local produce," 19 people said, "Maybe, if I see something that looks good," and 47 people chose, "Yes, I will definitely try to buy local produce."

The 66 respondents who responded that they might buy local produce on their next shopping trip were asked to use a 5-point Likert scale to rate the importance of reasons they may or may not choose to buy local produce. Results are displayed in Table 5.4. The most highly rated reason for buying local produce was "It's healthier for me and my family." The lowest rated reasons were "It makes me feel like part of the local community" and "It's helping to improve the food system."

Discussion

To our knowledge, this pilot program is the first to partner with rural grocery stores to design and implement local produce-focused interventions to increase healthy food purchasing. The experience has led to many useful insights and lessons learned, the most important being that this type of work is feasible. We were able to work with a regional food retail chain to identify individual stores that were willing and able to source local produce from area farmers. Store managers proved to be a key ally in maintaining local produce availability and fidelity of the intervention materials, leading to moderately successful program implementation.

We were able to increase the availability of local produce in the stores during the intervention period. It should be noted that although neither intervention store had planned to

source from local farmers during our intervention phase specifically, both had prior experience buying produce from the farmers they worked with on this project. This baseline familiarity with the farmers greatly helped with program initiation and consistency of stocking. Other food retail-based healthy purchasing interventions have also demonstrated success with increasing the stocking of promoted food items[35,84,58] and shifting the physical environment of the store.[36–38]

Customer-level outcomes

In general, we did not observe high interest in the intervention materials by shoppers. They tended to appear as though they were sticking to a usual shopping routine, and slight modifications in the store were either unrecognizable or not engaging. Of the individuals we observed taking note of the intervention materials, few actually selected the local produce for purchase. Some shoppers did notice the signs and did select local produce, but there is no way of knowing if these two occurrences are related. Asking shoppers about decision-making at the point of selection was not part of this study, and we therefore cannot know whether local produce would have been selected even without the presence of the intervention materials. It may take a higher-impact intervention approach, more time to shift customers' routines, or both to actually change the way people shop for produce.

When customers were asked to recall their shopping experience upon exiting the checkout line, most did not report that the intervention materials had influenced them to purchase additional produce. Many did not remember seeing the intervention materials at all, which may have been due to a variety of factors. First, the presence of many forms of messaging in the store may have led to oversaturation. Our food retail partner allowed the research team to develop all intervention materials, but they requested that their own branding colors and design elements be

used to ensure compatibility with existing store signage. A potential consequence of this design restriction was that the intervention materials blended in with all other messaging present in the store. When there are many signs that look similar, they may all fade into the background as noise and not catch the customer's eye. This effect may have contributed to the lack of reported visibility of the intervention materials. Additional factors, specifically in Store C, may have included inappropriate placement of materials; irrelevance of produce-specific materials; and the placement of physical barriers in front of the local produce, including a trash can, a wet floor cone, and a store stocking cart, which were routinely present during store visits.

The 10 social proof-oriented grocery cart signs placed in Store C were used by customers, but it did not appear that people selectively chose these carts to reflect their personal values or shopping habits; rather, they took whichever cart was the most easily accessible. The cart signs may still have had an influence on the purchasing habits of the cart drivers and other shoppers who saw them in the store, but we were not able to evaluate this with the data collection tools used.

The in-store intercept surveys did not reveal changes in customer purchasing behavior over time. A combination of our small sample size, our limited intervention duration, and the inability to track individual shoppers longitudinally likely contributed to this finding. However, a promising result of the in-store intercept surveys was the highly positive rankings of multiple potential reasons for buying local produce. This outcome, coupled with the majority of respondents reporting a preference for purchasing local produce when available and the intention to purchase local produce on their next shopping trip, indicate the relevance of this intervention strategy in our rural, predominantly low-SES population.

Store-level outcomes

Intervention materials that were not specific to a particular produce item were implemented with high fidelity. However, signs and recipe pads that required frequent changing to reflect the seasonality of local produce were inconsistently implemented. The low fidelity observed with these materials may have been related in part to the commitment level of the produce manager; however, we do not recommend intervention materials that require frequent adjustments on the part of store staff. Inconsistencies between local produce availability and posted intervention materials could lead to customer confusion and a lack of trust of "local" signage.

The intervention materials designed for Store C were intended to be placed in sign holders next to their corresponding produce displays. However, the produce manager chose to keep the majority of the local produce in display cases under the misting mechanism, which would have rapidly degraded the signage. Signs and recipe pads were placed above the display case, well above eyelevel. Unless the produce manager had been willing to move the local produce to floor displays like in Store B, we had no options for improving sign placement. Reshuffling the entire produce section to accommodate our intervention materials was not possible in this store.

Store B managers reported receiving positive feedback from customers who noticed the signs about local farmers and the local produce display and appreciated the transparency and knowledge that the store was buying locally, supporting local farmers, and giving shoppers easy access to fresh, local produce. Having a centralized location within the produce section to display most of the local produce seemed to draw shoppers' attention more than the local produce in

Store C, which was integrated throughout the produce area and did not have such visible signage. Managers in Store B maintained a higher number of intervention signs in their concentrated local produce area, which likely further enhanced visibility.

Strengths and limitations

Our partnership with a regional grocery store chain allowed us to conduct unique intervention research with some degree of autonomy in the design and implementation of our strategies. However, we were still obliged to seek approval for any intervention components we wished to test in the stores, thus limiting what we were able to try. We also faced challenges with regard to the frequency and timing of our data collection visits. Due to resource limitations, our data collectors were part-time study staff, who were able to visit the stores when their busy schedules permitted. Often, this resulted in midday data collection when the stores were not at their busiest. These factors limited our in-store intercept survey samples and the number of shoppers passing through the produce section during observations. However, the data collectors usually visited the same store each time, which is recommended by other researchers to build deeper relationships with the store manager partners.[58]

An additional strength of the present pilot study was the real-world nature of our study design. Rather than testing the efficacy of a highly controlled store-based intervention strategy, we aimed to evaluate the feasibility of a local food promotional campaign led by the store managers. Our hope was to see effectiveness of the intervention, but also to understand whether a local produce-focused healthy purchasing program could be successfully implemented without the heavy hand of research staff. In one store, we observed challenges with regard to fidelity of the intervention materials placement, especially owing to the produce-specific nature of the

materials and their need for frequent adjusting. However, the other store achieved high fidelity and low degradation of the materials throughout the 8-week intervention phase. This finding indicates great promise for the implementation of appropriately designed store-based interventions.

Finally, a frequently cited concern about the ability to market local foods to lower-SES consumers is the anticipated price increase attached to locally sourced food. One of the benefits of working with our specific store partners was their corporate policy prohibiting individual store managers from setting different prices for local produce; they must stay consistent with the prices in all other stores across the chain. If one store buys a product from a local farmer at a different price than that established for that product by the company's distributor, the store is not allowed to pass along savings to shoppers if prices were lower or inflate the price if prices were higher. Thus, price differences should not have been a factor in customer decision-making with regard to local vs. nonlocal produce. Still, the potential for customers to perceive or expect differences in price in response to "local" signage remains a possibility. Formative work indicated that our study population did not consistently expect local produce to be more expensive, and some participants stated that they would be willing to pay slightly more for local foods (see Chapter 4). We have no reason to believe that price expectations affected consumer decisions in the present study. Still, future studies should explore this with their own population or consider incorporating messaging about price into intervention materials.

Conclusions

The present study evaluated the successful implementation of two intervention strategies in low-cost grocery stores located in rural communities in North Carolina. With effective

partnerships, it was possible to increase the amount and diversity of locally produced fruits and vegetables stocked in these stores. Store manager enthusiasm and dedication were critical for maintaining sourcing relationships with the farmers and fidelity of the intervention materials in the stores. Strategies for capitalizing on affinities toward local food as a way to increase healthy food purchasing show promise but need further development. Future work must include relationship building with corporate retailers, individual store managers, and farmers who are willing and able to sell their goods to the stores. Beyond relationship building, efforts must also include an extensive formative component to understand the complex determinants that shape consumer food purchasing behavior in a given context, specifically with regard to local food. Finally, detailed process evaluation is critical for understanding the quality of intervention implementation and the many factors that may have influenced program effectiveness.

Table 5.1. Community demographics[68,69]

Intervention community	Population	Nonwhite residents	Families below poverty level	Individuals below poverty level	Median household income ($)	Households receiving SNAP
A[1]	1,477	7.1%	11.6%	16.7%	33,988 (±4,437)	12.3%
B	1,692	24.2%	26.1%	29.8%	30,135 (±6,560)	24.4%
C	862	57.0%	7.5%	15.6%	34,088 (±8,449)	20.5%

[1]Community A was ultimately not included in the intervention implementation due to the inability to source local produce

Table 5.2. Intervention styles and their components

	Store A	Store B	Store C
Intervention style	*(N/A)*	*"Know your farmer" + reciprocity*	*Social proof + cross-selling*[2]
	(N/A)	Local produce was aggregated into a single, highly visible display (with the exception of some items that required cold-case storage; these still received intervention materials in their own location)	Large (8"x10") and small (3"x5") "LOCAL" signs placed next to all local produce items
		"Know your farmer" signs with brief farmer biography and photo	Round stickers (3") with a cartoon tomato saying, "I buy local!" placed at registers for customers
		Small (3"x5") "LOCAL" signs placed next to all local produce items	Signs placed in 10 grocery carts with the cartoon tomato saying, "I buy local!"
		Two types of reciprocity signs: "From the [Farmer] Family's farm to your family's table. Choose to support farmers in our area!" *and* "Grown for you with care less than 50 miles from home. Show your appreciation for our community's farmers!"	Cross-selling signs placed next to specific local produce items with the cartoon tomato saying, e.g., "Folks who buy local yellow squash also like to by local zucchini. Try them together in this recipe!"
		Miniature chalkboard signs to display local produce pricing[1]	Tear-off recipe pads (3"x5") using ≥2 local produce items with preparation methods for seasonally available produce (e.g., a frittata using local zucchini, tomatoes, and onion, along with nonlocal ingredients). Recipe pads were paired with cross-selling signs.
		Signs were attached to burlap-lined display bins using clothespins[1]	

[1]These intervention components were suggested by the store manager
[2]Produce placement was not a component of this intervention strategy

Table 5.3. Demographic characteristics of in-store intercept survey respondents by store

Demographic characteristics	Store B (N=38)	Store C (N=29)
Gender[1]		
Female	28 (74%)	18 (62%)
Male	10 (26%)	11 (38%)
Age		
18-24 y	6 (16%)	4 (14%)
25-34 y	3 (8%)	6 (21%)
35-44 y	5 (13%)	4 (14%)
45-54 y	8 (21%)	4 (14%)
55-64 y	9 (24%)	8 (28%)
65-74 y	5 (13%)	1 (3%)
≥75 y	2 (5%)	2 (7%)
Race/ethnicity[2]		
African American or Black	7 (18%)	20 (69%)
Hispanic or Latino	4 (11%)	1 (3%)
White	26 (68%)	6 (21%)
Other	1 (3%)	2 (7%)
Number of children <18 y in household		
0	15 (39%)	13 (45%)
1	7 (18%)	3 (10%)
2	9 (24%)	3 (10%)
3	1 (3%)	2 (7%)
4	1 (3%)	2 (7%)
≥5	1 (3%)	2 (7%)
Educational attainment (self)		
Less than a high school diploma	2 (5%)	5 (17%)
High school diploma or the equivalent	22 (58%)	10 (34%)
Trade/technical/vocational training	3 (8%)	5 (17%)
Associate degree	7(18%)	2 (7%)
Bachelor's degree	3 (8%)	4 (14%)
Master's degree	1 (3%)	2 (7%)
Professional or doctoral degree	0 (0%)	1 (3%)
Educational attainment (other adults in household)		
Less than a high school diploma	4 (11%)	1 (3%)
High school diploma or the equivalent	13 (34%)	12 (41%)
Trade/technical/vocational training	6 (16%)	7 (24%)
Associate degree	3 (8%)	1 (3%)
Bachelor's degree	4 (11%)	3 (10%)
Master's degree	2 (5%)	1 (3%)
Professional or doctoral degree	1 (3%)	0 (0%)
Approximate household income		
<$20,000	9 (24%)	7 (24%)
$20,001 - $25,000	7 (18%)	1 (3%)
$25,001 - $50,000	6 (16%)	6 (21%)
$50,001 - $75,000	4 (11%)	3 (10%)
$75,001 - $100,000	6 (16%)	2 (7%)
>$100,000	1 (3%)	0 (0%)
Prefer not to answer	5 (13%)	10 (34%)

[1]No participants chose to self-identify gender

[2]No participants reported Asian, Native American/Alaska Native, or Hawaiian/Pacific Islander race/ethnicity

Table 5.4. Number of survey respondents with each rating of the importance of potential reasons for buying local produce (n=66)

Reason for buying local produce	1: not important	2	3	4	5: very important	Mean
It strengthens my community's economy	1	0	6	14	45	4.6
It supports small farmers	0	3	2	14	47	4.6
It makes me feel like part of the local community	0	3	9	12	42	4.4
It's helping to improve the food system	1	2	6	16	41	4.4
It's better for the environment	0	3	3	16	44	4.5
It's healthier for me and my family	0	2	2	10	52	4.7

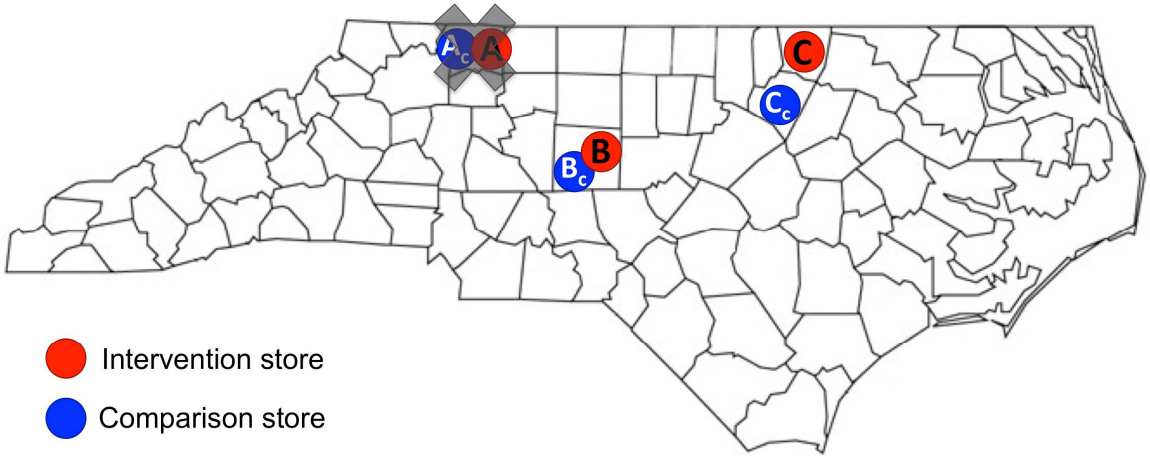

Figure 5.1. Intervention and comparison store locations[1]

[1]Store A was unable to procure local produce in time to participate in the intervention phase of this study

Figure 5.2. Local produce displays and intervention materials in Store B

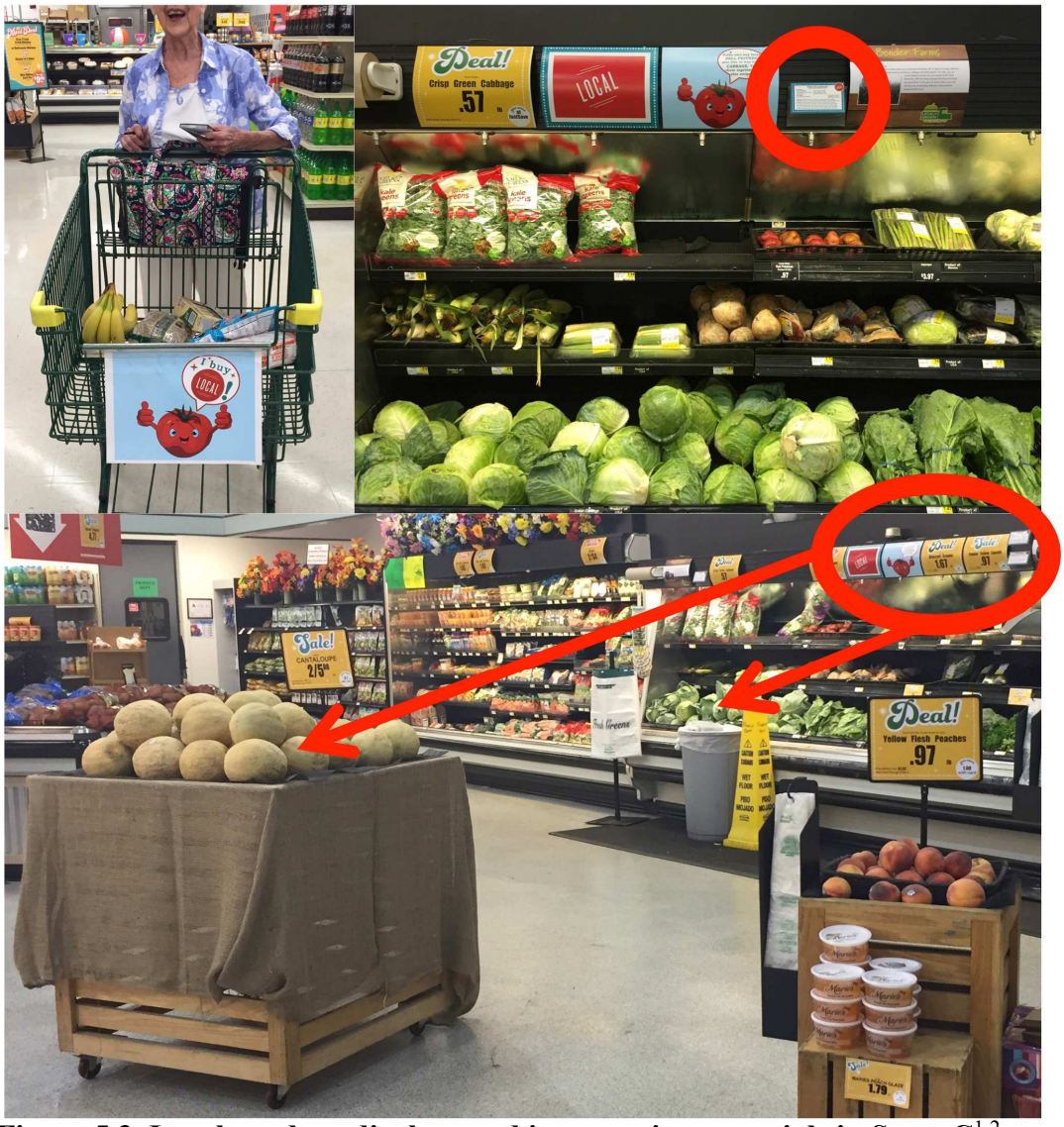

Figure 5.3. Local produce displays and intervention materials in Store C[1,2]

[1]Top right photo shows placement of 3"x5" recipe pads (circled) above produce display case
[2]Bottom photo illustrates incongruity between intervention material placement (circled) and local produce location (arrows)

CHAPTER VI: CASE STUDIES: THE IMPLEMENTATION AND QUALITATIVE EVALUATION OF A PILOT LOCAL-FOOD-BASED INTERVENTION PROGRAM WITH TWO GROCERY STORES IN RURAL NORTH CAROLINA

Overview

Background: Promoting locally grown, fresh produce in grocery stores may be a novel approach for increasing healthful food purchasing in rural, lower-socioeconomic status communities. The feasibility and success of local food-based health promotion interventions in grocery stores is unknown.

Objective: To evaluate the implementation and acceptability of two local produce promotional interventions using two rural grocery stores in North Carolina as case studies.

Methods: Post-intervention implementation in-depth interviews were conducted with the store managers and farmers involved in this program. Selected produce sales data were obtained from the corporate retail partner for one month pre-intervention, the two months of intervention implementation, and one month post-intervention. Data were collected for both intervention stores and compared to the same data aggregated from 17 comparison stores. An additional comparison was made with sales from the previous year.

Results: The store managers did not perceive their customers to value local sourcing above attributes like price and quality. However, they reported receiving positive feedback from some customers about the increased availability of locally sourced produce. Despite the increased labor required for working with individual farmers, the managers intended to continue these relationships. The farmers also reported positive experiences selling directly to the stores, despite

the relatively small returns they received. Limited sales data were unable to conclusively evaluate whether the interventions had an effect on consumer purchasing behavior.

Conclusion: Findings from this study indicate the acceptability of a local-food-based healthy purchasing intervention in the grocery store context. Sales data were not adequate for testing whether the interventions impacted produce sales. Future work should build on the lessons learned in this study and develop more robust experimental designs in conjunction with food retailers.

Background

We present two case studies to explore the implementation and maintenance potential of retail-based healthy food purchasing interventions in rural North Carolina. The interventions were designed to capitalize on evidence suggesting consumer preferences for locally grown foods. Stores have a motivation to sell more fresh produce because the margin on these perishable items is often much higher, and consumers may prefer to have locally grown produce available where they shop most frequently.[5,6,10,11,62–64] The grocery stores included in this study had previously established relationships with local farmers from whom they could source locally grown produce.

The case study method is here employed to gain deeper insights into the *"hows"* and *"whys"* underlying the implementation of two local-food-based healthy purchasing interventions in two rural grocery stores in North Carolina. The real-world nature of the study setting introduced significant challenges to effectively evaluating program success. Therefore, the case study method is an appropriate tool for additional evaluation.[85]

Methods

Study setting

The grocery store setting for this study has been described previously (see Chapters 4 and 5). In brief, we partnered with a regional grocery retailer to test the effectiveness of two local-food-based interventions in two stores located in rural and lower-SES communities in North Carolina. Each store committed to sourcing at least three types of locally grown produce for the duration of the intervention phase, which occurred during July and August of 2015. The two farmers who were supplying the stores (one farmer per store) were also aware of this study and agreed to ensure continued produce supply to the stores for the study period.

Data collection

Qualitative data. The store managers and participating farmers consented to post-intervention in-depth interviews with the lead researcher. The interview guides were semi-structured and designed to elicit information about each party's unique perspectives on the intervention program. These qualitative data provide detailed insights into the ease of program implementation, any extra work required to sell or procure produce directly from farmer to store, and perceived success of the program. In addition, all parties were asked about their intentions to continue working together in the future and what, if anything, they would do differently. Two managers from Store B (Produce Manager and Assistant Store Manager) were interviewed together. One manager from Store C (Produce Manager) was interviewed. The two farmers who participated in this project each gave one interview.

Quantitative data. Our corporate retail partner consented to providing the research team with sales data to allow a quantitative analysis of the effectiveness of the program. Due to the

proprietary nature of store sales data, the corporate partner had full control over which types of data they shared. The initial plan for data sharing was co-developed by the research team and the retailer.

Analyses

Qualitative analysis. Interviews were audio recorded and transcribed verbatim by a third-party transcription service (Transcripty). They were imported into Dedoose qualitative analysis software (Version 6.2.17, SocioCultural Research Consultants, LLC, Los Angeles, CA) for coding and analysis. All transcripts were coded by the primary researcher. Simple codebooks for the manager interviews and the farmer interviews were developed deductively based on our existing research questions.

Quantitative analysis. The sales data we ultimately received from our retail partner was different from the initially agreed-upon dataset. Thus, our quantitative analysis plan changed substantially. Data were summarized and assembled into a simple table using Microsoft Excel, allowing simple visual comparisons to be made. No statistical testing of any kind was ultimately possible.

Results and Discussion

Store manager perspectives

Implementation of the intervention. The managers were asked about why they agreed to participate in this pilot intervention trial. One manager replied,

"I just thought it was a good opportunity for us to do something different and see what happens with it. If it can grow sales and do something that sets us apart from everybody,

[competitor store], and everybody else around us, I just thought it was a good opportunity for us." (Produce Manager, Store B)

The interviewer then asked about the managers' impressions as to whether those two outcomes, growing profits and setting the store apart, occurred. They replied:

Produce Manager: "I think so."

Assistant Store Manager: "Sales come up."

Produce Manager: "Yeah, we had a good summer. Very good summer."

They were asked to what they attribute their successful summer, and they thought that it was in part due to the local produce, and also due to some other changes they had implemented, including offering a wider selection of prepared produce (e.g., a "fajita mix" of pre-chopped onions and peppers). Another technique they spoke about using more was sampling. They would prepare items like watermelons and cucumbers and place them in sampling displays in the produce section, and they would also offer to cut open and sample an item a particular customer was interested in. The managers reported that this technique reduced the perceived risk some customers felt when considering trying a new product, including the local produce items.

The managers described their experiences interacting with the intervention materials and customers around the local produce. When asked how they informed customers of the increased local produce availability, one manager said,

"Pretty much just letting them know it's local, letting them know the quality's good, let them know that I was a produce manager before I became a co-manager, and I dealt with this local grower for several years now, and it pretty much outsold more than what he could sell at his farm." (Assistant Store Manager, Store B)

This manager also described how he feels he is able to influence what his customers purchase:

"Well you just put it out there, you make a good display of it, keep it full, fresh, talk to the people about it, kind of let them know what you've got going on, they kind of adapt to it." (Assistant Store Manager, Store B)

Determinants of consumer behavior. Pricing of local food is a common concern among consumers and store managers alike (see Chapter 4). The company's policy is to keep pricing consistent across all stores in the chain. Thus, if one store obtains a cheaper product from a farmer than what the other stores are getting from the distributor, they are not able to pass the savings along to customers. However, one manager explained to us that this presents an ethical dilemma, as they don't feel right about keeping such a high margin on the product. In some cases, managers may use store-level techniques for adjusting their own prices without the company's knowledge:

"It's just like, our cantaloupes this week are $1.97 on sale, and [the farmer] only, they charge me a dollar for them, and they're big, beautiful. So I've still got some left, so my ad will go off today, and I'm going to keep them at my price until they sell out. So I am going to keep running them at that price, maybe $2.25. Yeah, I'm not going to put them back to the regular price. […] If somebody's really checking in the office, they could see that my melons are not what the price allows. Because I think that's highway robbery. Personally, I don't think that's right. I don't." (Produce Manager, Store C)

One manager spoke about the store's clientele and their purchasing habits in terms of how he perceives their healthfulness and their socioeconomic status:

"So, and then you've got more, bottom line is wherever you are with more healthier people that like health… should be doing pretty good with blueberries. But you get out in the country, and they're not really healthful people, you know what I'm saying? […] I mean, you sit here and you think, 'well, do I want to pay five dollars for a little pint of blueberries? Or do I go buy five-dollars-worth of ten-pound potatoes?' Well, they're going to do the potatoes over the, you know. So the clientele is just totally different, and usually when you talk to them […], it's kind of like everyday base what people eat. Sweet potatoes, cucumbers, squash… You're not in the high-dollar, the price of them is not as high." (Assistant Store Manager, Store B)

The same manager continued to describe the way he perceives customers to weigh various attributes of the produce items (e.g., taste vs. price vs. localness) in Store B versus another store located in a higher-SES community:

"But this clientele is a little bit different than, like I said, [a higher-cost store], and a lot of them… You've got to feel out the clientele. Because here, it's not as much where it comes from, it's the price point. But now, when it comes into effect where it makes a difference, it's kind of like, [the farmer is] good about, if I get it from [the distributor] for that, then that's what I paid from him for, which then you're in the same price point. Well, now which one do you want? You want some from California, or you want something local? Well, if I'm paying the same price, why wouldn't I just go ahead and take local? That's the way they think." (Assistant Store Manager, Store B)

At the same time, the Store B managers felt that localness was a positive and motivating factor in consumer decision-making, specifically due to feelings of nostalgia and community ties:

Produce Manager: *"Sometimes if you're able to get people reminiscing and thinking about… You can sell anything, you pull on those heart strings a little bit."*

Assistant Store Manager: *"I learned the best work, tell them where it's coming from, tell them it's local, let them try it, ask them what they think, and I think it goes a long ways because you're not just selling local, on our part, we're not selling local, we make it community with them. And a lot of people aren't used to walking in, you take your time out to sample something to them, or try to help them understand anything about the product. […] If they haven't tried it, a lot of people in this clientele are not going to spend the money if they haven't ever tried it, and if their family hasn't ever tried it, then it's probably no good, so they don't eat it. At least you sample it, then they're like, 'Wow, I didn't know it would be that good.'"*

The produce manager from Store C was asked whether the store's clientele seemed to appreciate or value the local produce availability. The manager believed that local food was such an embedded aspect of the community culture that it might not stand out as being unique or special within the grocery store context:

"Well, you know, this would be my personal opinion. I don't, personally… Some of the people I know, I know a lot of them do their own gardens, and they do go to different farmers that have got produce stands. I don't know much about this little farmer's market they have up here in this part. I don't know who runs that, but I don't know if it really matters to these local people because they're so used to having fresh product. Now, if you went to a big city, [blinded], I'm sure they would love it because they like their fresh produce. They're not used to this type of environment, or living like we are. […] It's the culture, what they're used to. I mean, they're used to this [local produce]." (Produce Manager, Store C)

In fact, the research team observed that respondents to the in-store intercept surveys (see Chapter 5) routinely declined to take the free produce item offered to them as compensation for their time, stating that they had a large amount of the seasonal produce coming out of their home garden at the time. This anecdotal evidence indicates that local produce availability in the grocery store may not be important to consumers who grow gardens at home. Instead, if local food is valued and desired in the grocery store, it may be more important to understand which produce or other items (e.g., eggs, dairy, meat, seafood) are less available from home gardens or other markets (e.g., farm stands, farmers' markets, community resource sharing). One store manager agreed that it's likely those without gardens who most appreciate the local produce availability in the store:

"I guess basically the ones that are probably most excited about it do not have gardens, and they like when the summer comes around to get their local product, or get homegrown, basically garden product. I think they're the ones that I see that are happy to know that it's coming from somewhere local. Because they don't have farms, but they like their fresh product." (Produce Manager, Store C)

"It's your culture, your environment, what you're used to having." (Produce Manager, Store C)

"But like I said, I believe you might have got a better response out of this seriously if you'd have been in an area where there's not a local food, gardeners, and stuff like that, I believe you probably would have gotten a better, people more excited about it, because like I said, this is their culture, they're used to having gardens, they're used to all these other local people, and it's nothing new to them, it wouldn't be like something new that just popped into the

area, something to get excited about, this is like everyday life, this is what we see, this is nothing new to us." (Produce Manager, Store C)

During the formative phase of this study, customers were interviewed about their perceptions, preferences, and typical shopping behaviors around local foods (see Chapter 4). In a simple choice experiment, participants were asked whether they would prefer to buy a local version or a nonlocal version of the same produce item, all other attributes being equal. Many shoppers reported that they would prefer to buy the local item, but price and quality were also very important. To understand the store managers' perceptions of their customers' preferences and behavior, we asked them a similar question:

Interviewer: "Okay, so in this store, if you had a pint of local strawberries, and a pint nonlocal strawberries, and they were the exact same price, you think people would pay attention to where they're from?"

Assistant Store Manager: "Yeah."

Produce Manager: "Yeah."

Interviewer: "Do you think they'd be looking at the quality, or the location more, or both?"

Assistant Store Manager: "I still think they're going to look at quality."

Produce Manager: "Yeah, quality."

Assistant Store Manager: "Quality sells everything."

Quality was also an important factor in the managers' satisfaction working with the farmers. The managers at both stores reported that produce from the farmers was consistently of very high quality, often even surpassing that of the produce they typically received from their distributor:

"Well, his [the farmer's] quality is great, even though local. A lot of the time local product doesn't hold up. His local product holds up. So he knows what we stand for, he knows it's all about quality, he knows it comes through the door, he's not going to bring anything through the door that's not quality, that's going to hold up." (Assistant Store Manager, Store B)

"Some of our product, I probably shouldn't say this, but some of our product we get in [from the distributor], it looks rough. It doesn't look good." (Produce Manager, Store C)

"That's why I'm telling you, it's got to be eye appealing. I don't care what it is. You can sell anything if it looks good. I mean really, if it looks good, honey you can sell it. I can guarantee you that. If it looks good, it will sell, and sometimes if it looks that good, the price issue isn't a problem. I mean really, it's not. Like I said, if you can get like, tomatoes would be a good one, local, that would sell well. The local watermelon, cantaloupe, and the corn. Those four items I think would be a good seller if the people knew that it was local. And probably the squash. Because everybody likes to have their greens, summer gardens, you know the variety of squash, string beans." (Produce Manager, Store C)

"To me they still go hand in hand, the price and the product. And the quality. Quality definitely too. They're your three main things that, I mean, I guess that would pretty much do with anything, everybody's, I guess you look at the price first. You're going to look at the price, and then you're going to look at the quality. I'm going to look at the price, the quality, and then I'm going to want to know where it comes from." (Produce Manager, Store C)

Project outcomes. The managers were asked to describe how they perceived the success of this program. Factors they considered included the intervention materials, their interactions with the farmers, and the responses they received from customers.

First, the managers described their thoughts about the intervention materials:

"I mean, we told people about it, but I think we pretty much just kind of let it run, and I think the signage and everything, I think that really helped draw attention. I think that helped, but you can't just put it out there and expect people to know that that's where that came from. But I think the signage, that helped us a lot as far as attracting attention to it." (Produce Manager, Store B)

"…people will communicate with you, but a lot of times it's kind of like if you stand around that area, they don't go hunt you down, if you stand there by the local, they'll say, 'I see that's local. Where's it coming from?' Stuff like that, they're just curious about that." (Assistant Store Manager, Store B)

The Assistant Store Manager from Store B spoke extensively about how store managers can influence what their customers buy. He felt that the attractiveness of a display had much more to do with drawing customer attention than any signage. He explained that when produce displays are full and appear especially attractive and abundant, shoppers will perceive this to mean that the item is on sale and will pay more attention to it. He described this phenomenon here:

"Yeah, that's just, I was trying to get attention and draw them to [the local produce], but I don't really think that's what did it, I think the only big spillover, piling it out there, and making it pretty, and neat… it spoke for itself. The draw, you've got to have something to draw you to it before you even worry about whether it's local or not. You've got to make an impression out of it. If you make a big statement, impression on it, and then they find out it's local, that's a plus. It's kind of like when we've got USA watermelon, but they're not local, you build a mountain of them. They're going to come after them. 'Them things on sale!' They're going to come for them. So usually we've got something like that. I'll be honest with you, if we

just took the local and stuck it on the rack like we do everyday stuff, I don't know how good it would do. I don't even think they would notice it." (Assistant Store Manager, Store B)

The produce manager from Store C had similar feelings about the adequacy of the intervention materials:

"As far as your signage, or the whole, no, I don't know. Like I say, we might put the recipes in a different area, but as far as your signage, they were bright, colorful, they should have gotten anyone's attention to look at it. But like I said, sometimes I don't really know how much attention people pay to them signs. Because I don't think they really read the product. Because, you know we've got that [competitor store], and they'll bring that ad in here. They don't read the paper. 'I thought this was [competitor store].' 'This is [Store C].' I don't know why they get us confused with that store. 'Well, you had such and such on sale,' I said, 'No ma'am, we do not.' I'll say, 'What ad have you got?' 'I've got that [competitor store]. I thought that was y'all.' So I don't know if these people around here really read, pay attention and read stuff. I really don't." (Produce Manager, Store C)

Next, the managers were asked whether they received any comments or feedback from customers about the availability of local produce:

"Well, I did have a lady the other day who asked where the cantaloupe came from because she could tell they were local. She said, 'I can tell.' She said, 'I love this. I know they just came out of a field because it's got the dirt on the bottom.' She said, 'It's got the dirt. You know where it's laying, the cantaloupes.' And I told her they were [from the farmer], and she said, 'Well great! That's what I want because he has good produce.' And that was just on the cantaloupe, and plus she did get some of the personal, I got personal melon from him, and she

got on the personal melon too, so she was pleased to know that it was local." (Produce Manager, Store C)

None of the store managers reporting receiving any negative feedback from customers or other store employees about the local products or intervention materials.

We then asked the managers for their thoughts on the overall success of the program, including their interactions with the farmers. The produce manager from Store C felt that timing and supply were two limitations of the project in this store:

"I wonder if this could have, you know, been going a little bit longer. Perhaps when people really got into it. Because at first, you know, you'll sell… [The farmer] was slow with some of his product. He didn't have it some weeks. We couldn't jump right on it from day one. I don't know, I wonder if that would have made a difference, having ample supply of stuff. But like I say, this was new to him as far as having supply and demand at that point in time, it was new to him, and the weather plays a part in it, the rain, everything. So I don't know, maybe, you know, I'm beginning to wonder now that people are paying a little more attention. If we had longer to go, it would have done better." (Produce Manager, Store C)

"I guess to kind of, I don't know. I really wonder if either the weather didn't cooperate, or he didn't have so many products like he thought. I don't know if this was kind of new to him, trying to tell you all when he was going to have items, but you know I was kind of like, I needed to, when it first started, I guess I needed a better idea of when he was going to have his product, how long his product was going to last. Because I don't think I've gotten squash maybe, was it once? I think before he was out, and see the corn, if I'd have had an idea beforehand… Because I like to book my items two weeks in advance, and some of the product I already had booked, but if I had known ahead of time that he was going to have this, which I know he couldn't always

guarantee it, but I would still have the general ability not to book this, I can just open order if I needed it. That would have helped in a couple of cases. Like with the corn, and the squash, and he did have some zucchini I got from him once or twice. If I'd have had a little bit better idea, like I said, it wouldn't be set in stone. He couldn't exactly guarantee me. But I'd have had a general idea what week he might have had a product, I might could have gotten a bit more from him on certain items." (Produce Manager, Store C)

Finally, the managers were asked about the extra work required to source produce directly from the farmers and whether they planned to continue this relationship beyond this project. All three managers acknowledged that it took time, patience, and dedication on the part of the managers and the farmers to make these relationships work:

"Local isn't going to be a good seller unless you've got your people. Because it takes dedication to bring a local person in and sell their product because it's twice the work." (Assistant Store Manager, Store B)

"Yeah, […] you know with [the farmer], we had to really plan. He was only coming once a week, so we had to think, 'For this week, how much squash are we going to need? How many cukes are we going to need?'" (Produce Manager, Store B)

"I don't call it being that much [extra work]. Basically, we got on the same page, and I'd call [the farmer], […] and I would let him know that I had to do orders by certain days, and when I let them know, and he got used to that and knew I'd call him on Saturday if I knew such and such, and 'give me an idea how many weeks you think you're going to have this product,' and he was real good and helpful about doing that. So we stayed right on the same page, and he kept me informed about what I needed to know, and how to get the product I needed from him, and he was real good about letting me know, '[blinded] I think I've got a couple more days of

this product, or another week, or let me check, give me two more days and I'll have more watermelon.' He kept me real informed. That was real helpful. He was real informed on what I needed to know." (Produce Manger, Store C)

The managers at both stores indicated that they were planning to continue buying some produce directly from the farmers they worked with for this project. They also mentioned that they were planning to speak with other local farmers to see if they had additional products they could bring into the store, despite the extra work this would require.

Farmer perspectives

In addition to the store managers' perspectives on the feasibility and maintenance potential of this healthy food purchasing promotional strategy, the farmers' perspectives are also critically important. First, the farmers were asked about the experience working with each of the stores:

"This year was my first year with (Store B), and that was because of (Assistant Store Manager, Store B). Because he knew what I sold, and me and him had a good relationship from [prior store] for two years, and we just, he helped line up a couple stores in the area for me, and that's where I started to sell to them. I sold to him a lot. He really helped push my product more than the other stores, and he did a good job, and he always does." (Farmer, Store B)

When asked about potential barriers to selling directly to grocery stores, the Store B farmer emphasized how important it is for his product to be valued for its high quality:

"Not really too many barriers as long as, you know there's an understanding of the quality, if they don't understand the quality, and my value that I, because it costs me more to grow a prettier crop than it does so and so to grow an ugly crop, so it's worth more if there

wasn't, because some managers don't understand that, some are easier to deal with than others. And some, like [Assistant Store Manager, Store B], he's always wanting to buy from me, he'll call me with this and that, we'll talk all the time, communicating." (Farmer, Store B)

The need for stores to understand the difference in production costs to grow high-quality produce was echoed by the farmer for Store C:

> *"I think if grocery stores really want to, and it's going to take a little while, but if they want local, and they want that high quality, they're going to have to understand that they have to pay more for it because it costs more to grow it." (Farmer, Store C)*

The farmer for Store B elaborated on this point:

"Smaller farmers can't make as… Larger farmers, I mean, they're probably okay because they can sell a million boxes of something and make a dollar a box, and they've got a million dollars in their bank account, whereas a smaller fellow was to sell a thousand boxes, and make a dollar a box, he should have just went and got a regular job. I mean I'm not saying his sweet potatoes are worth more, or anything, or that they should pay more to a smaller farmer just because he's small, I'm just saying that typically the quality really matters, and a lot of times to big corporations, quality doesn't matter. I've been to another grocery store, not [partner retail chain], and brought them sweet potatoes that would just put what they had on the shelf to shame. I mean what they had on the shelf, I would have thrown away, in the trash, and I took it to the store, and I was wanting 22 dollars a box, between 20, and 22 dollars a box for my sweet potatoes, because my quality was there, and they were really pretty, and it's worth it, and the produce manager agreed with me because he saw what I saw, and he knew that it would sell better, and it would be worth more to the customers coming in. Well he wasn't allowed to make

that call where he could pay me that much, because he was getting them for 15 dollars a box, which of course they were 15 dollars a box, because they were junk, but he called his boss and said hey, I've got some really pretty sweet potatoes, this guy wants between 20, and 22 dollars a box, they're worth it because they're really pretty, the ones on the shelf don't look like nothing, and the man told me he could pay me 40 cents a box more and that's it, he didn't care what they looked like, he was working on the numbers, he didn't care about the looks." (Farmer, Store B)

Next, the farmers were asked about their thoughts on the importance of local food. In reference to increased consumer demand for local food in recent years, one farmer was asked whether he believed it was becoming "trendy" or is an important aspect of the food system:

Farmer: *"I think it's not a trend. I think it's something that's going to be here to stay, and it's important. But I think it's, when it first started coming out, I think local food, some people, or some stores, I think local to them could possibly be out of state. It's within so many miles or something, right?"*

Interviewer: *"Well, there isn't actually a set definition for it."*

Farmer: *"Yeah, I mean local to me, and local to most people around here anyway, is like 20 minutes. I mean, I guess 40, 45 minutes is fine too, but I don't think you get much more local than 15 minutes from here to the store. That's pretty fresh. I think it's going to start tightening up a little bit, but they can only tighten up so much because then they won't have many farmers that they can pick and choose from. So I don't know, I guess 50, 60 miles is pretty local. But yeah, I definitely think it's here to stay, and people look for that. I know if I was personally wanting to go to the grocery store, I'd want it to be from around here if I was buying something."*

Interviewer: *"Why is that?"*

Farmer: *"Because sometimes you just feel good to support somebody that's in your community, I think, other than somebody you don't know or anything like that. Which, that's okay too, but something about the community aspect of it, helping your farmers in your community, and you know your farmer. A lot of people know, a lot of people that buy that stuff know me, know the farm and stuff. So that helps sell it too because you put a face to the name of the farmer. I just think it's that aspect of it."* (Farmer, Store B)

The farmer who worked with Store C also mentioned the nuanced definitions of "local" food: *"To me, local food is truly local: within no more than 50 miles. Or, you know, I guess when you have a food service system like [grocery distributor], it's really hard to try to get it that narrow. I would like to believe that if we supply watermelons and cantaloupes to [distributor] to go through the [blinded] stores next year, that that would still be local, even though it is maybe a hundred miles, or even several hundred miles. So I guess the local probably should be broader than that, maybe within a 250-mile radius of where it's consumed. Certainly what's not local is something that travels on a truck for a day. Florida is not local to the mid-Atlantic, Texas and California are certainly not local, and so that's probably a better way of defining it. Truly local is something that's actually consumed within a ten-mile radius, but there are layers of definition."* (Farmer, Store C)

This farmer also spoke about local food more broadly, pointing out areas of contention and issues that should be addressed:

"Slightly blemished, or slightly out of the size range… You raise watermelons, and you say you want this size, what do you do with the ones below and above? And to their credit, [partner store] was very good about working with us this year, on size of the melons with the crop we had. We'll see how that works next year, but they need to understand that locally produced, the

big growers that raise a thousand acres or whatever, they can stand, they're looking at a much smaller profit margin, they just run a lot more acres. So if they don't make as much profit per acre, they're okay. A small grower needs to maximize it because we're only raising a few acres, relatively speaking. So that's, if there's a problem with local foods, that we still need to tackle that. We also need to tackle the idea that we can't necessarily have everything you want immediately because we don't have this huge volume here that we're trying to divvy up. We produce a small amount, and it goes, and don't call the next day and expect me to have something there readily available. So it will take a little more planning, a little more forethought to integrate local foods into this big system. I think the system has gotten used to having these big suppliers, whether they be in Eastern North Carolina, or Eastern shore of Maryland, or Florida, or Texas, California, where they can just get whatever they want whenever they want it. That's a very convenient thing to do, but it doesn't fit very well with trying to say we want locally produced goods." (Farmer, Store C)

Because price was so frequently mentioned by the store managers as a critical component of their customers' decision-making around food in general, we also asked the farmers for their perspectives. The Store C farmer was asked for his thoughts on lower-SES shoppers' preferences around local food. He replied:

"Right, I think it's not a matter… I think it's the terminology. I think the difference is, on lower-income, rural people, it's not that they don't want it [local food], it's what they can afford. They are not necessarily in a position to afford to pay for a higher quality product, to pay more for it. So sometimes wanting it is irrelevant." (Farmer, Store C)

When asked about his perceptions of how SES might play a role in how consumers perceive local food and food pricing, the Store B farmer stated:

"I think there's not much difference between the low-income, and the high-income demanding the local. Because some wealthy people will still complain about the price of it just as much as somebody who really can't afford it wouldn't complain about it. I don't know. I don't think there's really much of a difference." (Farmer, Store B)

To understand the time commitment and additional work required to sell directly to an individual store, the Store B farmer was asked to describe his process for delivery:

Interviewer: *"Do you deliver [to the store] yourself? Do you drive?"*

Farmer: *"Sometimes I drive, sometimes the fellow that you seen with my dog, I let him drive a lot too."*

Interviewer: *"Do you take into account what your time is worth, and all that?"*

Farmer: *"Me? Yeah."*

Interviewer: *"And it's still worth it to drive? Because [the store is] kind of far."*

Farmer: *"That's what I work out with the produce managers. Make sure that I have enough value on the truck, or I just won't go. It's got to be enough. I don't want to drive up there for 200 dollars, spend 100 going there and back, that's, no. I try to keep it within the cost of me running up there not more than five percent of what I'm selling."* (Farmer, Store B)

The Store C farmer was also asked whether it was worth it to him to deliver his produce directly to the store. He responded:

"In this case, in which… Two things: and I don't know they were really… I don't think [corporate retail manager] would like this if he found this out, or if he knows about it, but they paid me cash when I took it in. So it's always nice to get immediate payment. Secondly, it's a local store, and like I said, I almost never went there [Community C] just to take them something, so it was more efficient. I could just, if [Produce Manager, Store C] called and said,

'I need a bin of watermelons,' I could load it up, and then I stop by the auto parts place and pick up an oil filter, or like I said, go wherever else I needed to do. So that made it very efficient for small amounts. I couldn't do that to go to [a town further away]." (Farmer, Store C)

This farmer was then asked if he would like to continue selling directly to Store C. His response was, "Sure." The farmer who worked with Store B also indicated his commitment to continuing to work with the store beyond this project.

Sales data

The store sales data we received from our corporate retail partner were different from that which had been agreed upon previously. The company underwent several transitions in their sales data management team and methodology during our study period, which impacted the data we were able to receive. Rather than obtaining data for our two previously selected comparison stores, we received aggregated data from 17 other stores in the retail chain. While additional data could make analyses more robust, we unfortunately lost some level of ability to interpret the data. For example, we cannot know whether some of the stores in the set of 17 were experiencing significant downturns in sales, thereby bringing the aggregated comparison store group's sales down as well.

The data indicate the sales of the top 16 produce items declined across stores overall, with the exception of the month of August from Store C (Table 6.1). In most cases, the two intervention stores fared better than the comparison stores. Yellow squash, cantaloupes, and zucchini, three of the items that were sourced locally during the intervention period, had particularly strong sales in Stores B and C. Watermelon, collards, and sweet potatoes were also sourced locally for a portion of the intervention phase, but their sales numbers were inconsistent.

Ultimately, it is difficult to interpret the sales data we received due to our inability to definitively know which items were local at which times. Unlike the data we received, local produce sourcing did not follow a monthly pattern, which may mean that some items were local for one part of a month and not the other. This could have resulted in a washout effect for any potential observable differences in the data. Additionally, the data lack information about sales trends in each of the stores generally. We cannot know, for example, whether sales across all products increased in Stores B and C while decreasing in the 17 comparison stores. This could explain any potentially favorable outcomes in the results.

Summary

All store managers and farmers who participated in this study acknowledged the extra effort required to establish and maintain their business relationships with each other. However, all parties also indicated their desire to continue working together to maintain the local produce supply in the stores. The managers from both stores revealed that they were considering adding additional farmers to their supplier roster, despite the fact that this would further complicate their jobs. Reasons given for the managers' dedication to sourcing local produce included a recognition of the higher quality of products they could procure from the specific farmers they worked with, pride in feeling like they were going above and beyond in their jobs, and a commitment to supporting local producers. None of the managers believed that their clientele placed "localness" above attributes like price and quality, but they did report some positive feedback from customers who appreciated the local sourcing and high-quality produce.

The farmers were willing to continue delivering their produce directly to the stores, assuming the quantity was great enough to make the extra trip worth their while. They appreciated the additional business and brand exposure they received from this partnership, and

they both felt strongly about contributing to the local food system. Both farmers acknowledged that price is an issue for some consumers, but they firmly believed that their superior quality products cost more to produce and should be priced accordingly. Both farmers spoke about the need for consumers and store managers alike to develop a deeper understanding about the added cost required for small- and mid-sized farmers to produce uniform, high-quality produce that is fresh, tasty, and locally grown.

Lessons learned. The qualitative case study analysis undertaken in this study has provided valuable insights that should be taken into account in future work. First, we have revealed important store manager and farmer perspectives on the feasibility and acceptability of direct local produce sourcing as a means for promoting healthy food purchasing in rural and lower-cost food retail outlets. Purposive selection of the store managers based on their willingness to participate in the study and their pre-existing relationships with local farmers certainly enhanced the successful implementation of this study design. However, despite the fact that all parties noted specific challenges to working together, they all plan to continue their relationships after study completion. Our in-depth interviews allowed us to capture their motivations for doing so.

Second, we learned that one of the most important aspects of program evaluation might also be the most difficult. Despite many planning discussions with our corporate retail partners and preliminary verbal data sharing agreements, we were unable to receive the type of sales data that would have allowed us to evaluate the success of the program in terms of changes in sales. Future partnerships between researchers and retailers should ensure that the quantitative data analysis plan is feasible, co-developed, and robust to potential changes in data management by the retailer. Specific consideration should be given to the possibility of tracking sales by loyalty

card, as this will provide much more granular and meaningful data to the researchers and to the field.[86]

Finally, our work indicates the importance of continued investigation into the potential for improving healthy food purchasing through mutually beneficial partnerships between small- and mid-sized farmers and the grocery stores in their area. Rural and lower-SES communities may be a particularly fruitful focus for this type of research, as it yields the potential for a triple win: strengthening economic opportunity for farmers, enhancing consumer loyalty to the grocery stores, and providing increased access to healthy and desirable food for consumers.

Table 6.1. Change in sales of top 16 produce items from 2014-2015*

Produce item	July 1-31 Δ 2014-2015 (units sold)			August 1-31 Δ 2014-2015 (units sold)			September 1-30 Δ 2014-2015 (units sold)		
	Store B	Store C	Comparison stores (n=17)	Store B	Store C	Comparison stores (n=17)	Store B	Store C	Comparison stores (n=17)
Potatoes - Russet	-30.4%	-8.8%	-24.7%	-29.2%	3.2%	-19.7%	-28.2%	5.9%	-29.7%
Yellow Squash	57.9%	136.8%	97.2%	178.1%	360.0%	22.0%	33.3%	-17.6%	21.2%
Grapes - Red Seedless	4.8%	19.3%	-0.8%	128.0%	77.0%	85.4%	10.7%	76.9%	33.2%
Cantaloupes	22.9%	-8.1%	-22.1%	157.1%	258.1%	75.9%	-49.7%	-35.5%	-42.6%
Sweet Potatoes	62.5%	-100.0%	1.5%	192.9%	-100.0%	98.8%	-26.0%	-100.0%	146.8%
Blueberries	2.3%	-10.7%	15.2%	-64.7%	-60.9%	-72.5%	38.1%	-45.2%	11.7%
Strawberries	19.8%	-8.3%	15.4%	15.8%	10.9%	9.6%	-10.5%	-12.5%	1.5%
Tomatoes	N/A	-100.0%	850.0%	-100.0%	N/A	100.0%	N/A	N/A	13.6%
Onion - yellow bag/bin	-12.1%	-12.7%	-27.9%	-27.5%	-20.9%	-36.0%	-2.5%	-7.9%	-23.3%
Bell peppers - green	-11.2%	-50.8%	-24.3%	-11.4%	266.7%	-20.2%	-9.7%	524.4%	-14.6%
Cabbage - green	-17.0%	-4.9%	-14.6%	-31.4%	-2.5%	-30.4%	-12.8%	5.6%	-0.9%
Collards	12.5%	-47.6%	-2.5%	58.3%	18.8%	-3.3%	66.7%	120.0%	4.1%
Lettuce - head	-16.1%	-3.7%	-21.9%	-27.0%	-18.4%	-34.3%	-17.4%	-27.2%	-33.1%
Cucumbers	15.1%	-9.3%	0.8%	5.1%	-17.4%	-4.9%	-32.9%	-27.6%	-21.9%
Watermelon - personal	-11.7%	-3.2%	14.3%	50.7%	47.0%	6.6%	11.5%	31.8%	19.6%
Zucchini	12.5%	64.7%	15.0%	62.1%	107.1%	10.2%	14.5%	-14.3%	18.7%
Totals	-6.6%	-10.7%	-13.5%	-10.4%	3.9%	-17.7%	-18.6%	-4.5%	-19.9%

*Sales data from 17 other stores in the chain are aggregated to serve as comparison

CHAPTER VII: SYNTHESIS

Overview

Rural populations in the United States have disproportionately high levels of obesity and other diet-related chronic diseases.[70–72] Communities of color also experience multiple health disparities.[73] A primary goal of Healthy People 2020 is to "achieve health equity, eliminate disparities, and improve the health of all groups," including in rural areas and communities of color.[74] The high rates of diet-related chronic disease and obesity in rural communities are often linked with lower socio-economic status (SES) and reduced access to affordable, healthful foods.[75] Environmental determinants of health, including healthy food access, are a key focus of efforts to reduce disparities in diet-related chronic diseases.[7,76] Retail-based approaches to promoting health have focused on changing the retail environment through increasing the availability of healthy foods and making changes to the layout or structural components of the store in a manner to encourage healthier food choices.[33,35–38]

Despite evidence of growing consumer preference for locally grown food,[5,6] limited research exists about local food preferences among rural and low-SES individuals who tend to lack access to fresh produce and are disproportionately affected by diet-related illness.[1–4,7] We also know little about whether increasing the purchase of local food will result in improved dietary intake among lower-income consumers. Further, local food research has typically focused more on farmers' markets and Community Supported Agriculture programs than on grocery stores,[8,9] which are the primary retail outlets for American food acquisition.[10–12] This dissertation work aimed to address these gaps in the literature by investigating consumer

perceptions of local food and testing retail-based intervention strategies aimed at increasing the healthfulness of foods purchased by capitalizing on affinities toward locally grown produce. We worked with a regional food retail chain to test the interventions and included the customer, retailer, and farmer perspectives in our analysis of the program implementation.

To our knowledge, this pilot program is the first to partner with rural grocery stores to design and implement local-produce-focused interventions to increase healthy food purchasing. In addition, *this was the first study of its kind to qualitatively investigate the unique perspectives of consumers, store managers, and farmers who are all important components of the local food supply chain.* The experience has led to many useful insights and lessons learned, the most important being that this type of work is feasible. We were able to work with a regional food retail chain to identify individual stores that were willing and able to source local produce from area farmers. Store managers proved to be a key ally in maintaining local produce availability and fidelity of the intervention materials, leading to moderately successful program implementation. We increased the availability of local produce in the stores during the intervention period. However, our second aim failed to demonstrate that our intervention materials led to behavior change among customers. While some shoppers appeared to interact with the local food displays and select local items for purchase, most respondents to our in-store intercept surveys did not recall seeing the intervention materials, and we did not observe changes in intention to purchase local produce over time.

In our final aim, we expanded our evaluation of the success of program implementation by including the important perspectives of the store managers and farmers, as well as a cursory look at produce sales in our intervention stores and a comparison group. We expected to observe increased sales of local produce and total produce. However, we were unable to accurately assess

changes in sales due to the limited dataset we received from our corporate partners. We were able to see that the store managers and farmers generally received the program well, despite a persistent belief on the part of the managers that customers do not value localness above other attributes (including price and quality). One farmer described the difficulty in justifying delivery to the store for the amount of revenue it brought. Despite these factors, all parties reported that they would likely continue their relationship and maintain a local produce supply in the stores, when possible.

Strengths

In this dissertation, we posed novel questions, made new insights, and addressed important gaps in the literature. Our unique partnership with a food retail company allowed us access to customers, store managers, commercial farmers, and some level of sales data, providing us with a much greater understanding of how to effectively operate within this complex environment.

A frequently cited concern about the ability to market local foods to lower-SES shoppers is the anticipated higher price attached to "local" food. One of the benefits of working with our specific store partners was the corporate policy prohibiting individual store managers from setting different prices for local produce. Thus, shoppers did not have to make decisions about whether to purchase local foods based on values vs. cost.

Finally, this dissertation study used a real-world setting, rather than a highly controlled laboratory, to ask important research questions about consumer behavior and the dynamics of store-based public health interventions. Experiments such as this help to advance the field by

gathering feedback about the effectiveness of intervention approaches while also observing potential barriers to their implementation and ultimate success.[86]

Limitations

This pilot study was limited in its scope. Intervention and comparison stores were non-randomly selected to increase the feasibility of program implementation. Each store had a high level of commitment from store managers and had reliable direct-to-store delivery of locally grown produce. Although this may limit the generalizability of our findings, it also enhanced the potential for successfully implementing the interventions.

This study faced additional challenges in obtaining adequate sales data. Our retail partner had full control over their own data, and despite a preliminary agreement as to what would be shared with the research team, multiple unforeseen factors yielded a drastically truncated dataset. Nevertheless, this study provided the unique opportunity to examine the deep sociocultural framework through which rural, lower-SES consumers view local food and the complexities of delivering public health promotion interventions through the grocery store context.

Future directions

Our findings are limited due to the inadequate sales data received from our corporate retail partner and the narrow scope of this pilot study. We were only able to recruit two stores to participate in the intervention. Due to the myriad community-level factors that influence any grocery store, generalizability of our findings are limited. Future work should include a much lengthier formative phase, in which the retail partner co-develops all aspects of the study, specifically including data collection, sharing, and analysis. This will be a critical component of

any study aiming to better understand the dynamics of local food retail in the grocery store context. Objective sales data may be the most important motivator to stores considering the adoption of any new program or sales strategy. Electronic sales data and individually linked sales information from store loyalty cards would facilitate a much more robust quantitative evaluation of program success and would greatly increase the scientific rigor of future studies.[86]

Future studies should also include a context-specific qualitative component to better understand the perceptions and values around local food in a given community. This study confirmed the importance of these efforts, as many unexpected themes emerged from our in-depth interviews with consumers, leading to valuable insights that informed the intervention phase.

Finally, this dissertation work emphasizes the importance of more research on the effectiveness of a local food promotional strategy as a way to increase the healthfulness of foods purchased in grocery stores, specifically in rural and lower-SES contexts. Our formative work with consumers indicated the promise of this strategy, but in-store intercept surveys, interviews with store managers and farmers, and our lack of adequate sales data leave many questions to be answered.

REFERENCES

1. Calzada, P. J. & Anderson-Worts, P. The obesity epidemic: are minority individuals equally affected? *Prim. Care* **36,** 307–17 (2009).

2. Gittelsohn, J. *et al.* Understanding the Food Environment in a Low-Income Urban Setting: Implications for Food Store Interventions. *J. Hunger Environ. Nutr.* **2,** 33–50 (2008).

3. Wang, M. C., Kim, S., Gonzalez, A. a, MacLeod, K. E. & Winkleby, M. a. Socioeconomic and food-related physical characteristics of the neighbourhood environment are associated with body mass index. *J. Epidemiol. Community Health* **61,** 491–8 (2007).

4. Treuhaft, S. & Karpyn, A. *The Grocery Gap: Who Has Access to Healthy Food and Why it Matters*. (2010).

5. Frith, K. 'Is Local More Nutritious?' It Depends. *Harvard School of Public Health* (2007). at <http://chge.med.harvard.edu/sites/default/files/resources/local_nutrition.pdf>

6. Adams, D. C. & Salois, M. J. Local versus organic: A turn in consumer preferences and willingness-to-pay. *Renew. Agric. Food Syst.* **25,** 331–341 (2010).

7. Lutfiyya, M. N., Chang, L. F. & Lipsky, M. S. A cross-sectional study of US rural adults' consumption of fruits and vegetables: do they consume at least five servings daily? *BMC Public Health* **12,** 280 (2012).

8. Hinrichs, C. C. Embeddedness and local food systems: notes on two types of direct agricultural market. *J. Rural Stud.* **16,** 295–303 (2000).

9. Brown, C. & Miller, S. The Impacts of Local Markets: A Review of Research on Farmers Markets and Community Supported Agriculture (CSA). *Am. J. Agric. Econ.* **90,** 1296–1302 (2008).

10. Story, M., Kaphingst, K. M., Robinson-O'Brien, R. & Glanz, K. Creating healthy food and eating environments: policy and environmental approaches. *Annu. Rev. Public Health* **29,** 253–72 (2008).

11. Glanz, K., Bader, M. D. M. & Iyer, S. Retail grocery store marketing strategies and obesity: an integrative review. *Am. J. Prev. Med.* **42,** 503–12 (2012).

12. Escaron, A. L., Meinen, A. M., Nitzke, S. A. & Martinez-Donate, A. P. Supermarket and grocery store-based interventions to promote healthful food choices and eating practices: a systematic review. *Prev. Chronic Dis.* **10,** E50 (2013).

13. Webb, T. L. & Sheeran, P. Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence.

14. Armitage, C. J. & Conner, M. Efficacy of the Theory of Planned Behaviour: A meta-

analytic review. *Br. J. Soc. Psychol.* **40,** 471–499 (2001).

15. Robinson, R. & Smith, C. Psychosocial and demographic variables associated with consumer intention to purchase sustainably produced foods as defined by the Midwest Food Alliance. *J. Nutr. Educ. Behav.* **34,** 316–25 (2002).

16. Glanz, K., Rimer, B. K. & Viswanath, K. *Health Behavior and Health Education: Theory, Research, and Practice*. (Jossey-Bass, 2008).

17. Salmon, S. J., Fennis, B. M., de Ridder, D. T. D., Adriaanse, M. A. & de Vet, E. Health on impulse: When low self-control promotes healthy food choices. *Heal. Psychol.* **33,** 103–109 (2014).

18. Cialdini, R. B. *Influence: Science and Practice*. (Pearson Education, Inc., 2008).

19. Salmon, S. J., Fennis, B. M., de Ridder, D. T. D., Adriaanse, M. a. & de Vet, E. Health on impulse: When low self-control promotes healthy food choices. *Heal. Psychol.* **33,** 103–109 (2014).

20. Gordon, R., McDermott, L., Stead, M. & Angus, K. The effectiveness of social marketing interventions for health improvement: What's the evidence? *Public Health* **120,** 1133–1139 (2006).

21. Kamakura, W. A. Cross-Selling. *J. Relatsh. Mark.* **6,** 41–58 (2008).

22. Robinson, T. Applying the socio-ecological model to improving fruit and vegetable intake among low-income African Americans. *J. Community Health* **33,** 395–406 (2008).

23. Palma, M. A., Morgan, K., Woods, T. & Mccoy, S. Response of Land Grant Universities to the Increase in Consumer Demand for Local Foods in the South. **28,** (2013).

24. Lobao, L. & Meyer, K. The Great Agricultural Transition: Crisis, Change, and Social Consequences of Twentieth Century US Farming. *Annu. Rev. Sociol.* **27,** 103–124 (2001).

25. Woods, T., Velandia, M., Holcomb, R., Dunning, R. & Bendfeldt, E. Local Food Systems Markets and Supply Chains. **28,** (2013).

26. Chambers, S., Lobb, A., Butler, L., Harvey, K. & Traill, W. B. Local, national and imported foods: a qualitative study. *Appetite* **49,** 208–13 (2007).

27. Dunning, R. Research-Based Support and Extension Outreach for Local Food Systems Economic Benefits to Producers and Communities : 1–47 (2011).

28. Creamer, N. G. & Dunning, R. D. Local food systems for a healthy population. *N. C. Med. J.* **73,** 310–4 (2012).

29. Franklin, A., Newton, J. & McEntee, J. C. Moving beyond the alternative: sustainable communities, rural resilience and the mainstreaming of local food. *Local Environ.* **16,**

771–788 (2011).

30. Lamie, R. D. *et al.* Local Food Systems in the South : A Call for a Collaborative Approach to Assessment. **28,** (2013).

31. Megicks, P., Memery, J. & Angell, R. J. Understanding local food shopping : Unpacking the ethical dimension. *J. Mark. Manag.* **28,** 264–289 (2012).

32. Ball, K., Crawford, D. & Mishra, G. Socio-economic inequalities in women's fruit and vegetable intakes: a multilevel study of individual, social and environmental mediators. *Public Health Nutr.* **9,** 623–630 (2007).

33. Glanz, K. & Yaroch, A. L. Strategies for increasing fruit and vegetable intake in grocery stores and communities: policy, pricing, and environmental change. *Prev. Med. (Baltim).* **39 Suppl 2,** S75–80 (2004).

34. Horgen, K. B. & Brownell, K. D. Comparison of price change and health message interventions in promoting healthy food choices.

35. Lee, R. *et al.* Process Evaluation of a Comprehensive Supermarket Intervention in a Low-Income Urban Community in Baltimore. *J. Nutr. Educ. Behav.* **46,** S98 (2014).

36. Gittelsohn, J. & Trude, A. Environmental Interventions for Obesity and Chronic Disease Prevention. *J. Nutr. Sci. Vitaminol. (Tokyo).* **61 Suppl,** S15–6 (2015).

37. Payne, C. R., Niculescu, M., Just, D. R. & Kelly, M. P. Shopper marketing nutrition interventions. *Physiol. Behav.* **136,** 111–120 (2014).

38. Foster, G. D. *et al.* Placement and promotion strategies to increase sales of healthier products in supermarkets in low-income, ethnically diverse neighborhoods: a randomized controlled trial. *Am. J. Clin. Nutr.* **99,** 1359–1368 (2014).

39. De Marco, M., Gustafson, A. A., Gizlice, Z., Crowder, R. & Ammerman, A. S. Locally Grown Fruit and Vegetable Purchasing Habits and the Association With Children's Diet. *J. Hunger Environ. Nutr.* **9,** 372–387 (2014).

40. Edwards-Jones, G. *et al.* Testing the assertion that 'local food is best': the challenges of an evidence-based approach. *Trends Food Sci. Technol.* **19,** 265–274 (2008).

41. Coley, D., Howard, M. & Winter, M. Local food, food miles and carbon emissions: A comparison of farm shop and mass distribution approaches. *Food Policy* **34,** 150–155 (2009).

42. Hainmueller, J. *et al.* Consumer Demand for the Fair Trade Label : Evidence from a Field Experiment. (2011).

43. Grabowski, G. Living Local: Issues in the market. *Mintel* (2013).

44. Bond, C. A., Collins, F., E-mail, C. O., Thilmany, D. & Bond, J. K. Understanding Consumer Interest in Product and Process-Based Attributes for Fresh Produce. **24,** 231–252 (2008).

45. Ostrom, M. Everyday Meanings of 'Local Food': Views from Home and Field. *Community Dev.* **37,** 65–78 (2006).

46. Schneider, M. L. & Francis, C. a. Marketing locally produced foods: Consumer and farmer opinions in Washington County, Nebraska. *Renew. Agric. Food Syst.* **20,** 252–260 (2007).

47. Darby, K., Batte, M. T., Ernst, S. & Roe, B. Decomposing Local: A Conjoint Analysis of Locally Produced Foods. *Am. J. Agric. Econ.* **90,** 476–486 (2008).

48. The Role of sensory experience on Spanish consumer's willingness to pay for sustainable produced food Jessica Avitia. 18–24 (2012).

49. Perceptions, C. Ecolabel Ecolabel Value Assessment Value Assessment Phase II : Consumer Perceptions. 1–97 (2004).

50. Jekanowski, M. D., Ii, D. R. W. & Schick, W. A. Consumers ' Willingness to Purchase Locally Produced Agricultural Products : An Analysis of an Indiana Survey. **8,** 43–53 (2000).

51. Gracia, A., Magistris, T. De & Nayga, R. M. No Title.

52. Cranfield, J., Henson, S. & Blandon, J. Locally produced foods: The effect of attitudinal. (2008).

53. Racine, E. F., Mumford, E. a, Laditka, S. B. & Lowe, A. E. Understanding characteristics of families who buy local produce. *J. Nutr. Educ. Behav.* **45,** 30–8 (2013).

54. Zepeda, L. & Leviten-reid, C. Consumers ' Views on Local Food.

55. Verain, M. C. D. *et al.* Segments of sustainable food consumers: a literature review. *Int. J. Consum. Stud.* **36,** 123–132 (2012).

56. Grabowski, G. Living Local: Issues in the market infographic. *Mintel* 2013 (2013).

57. Steckler, A. & Linnan, L. *Process Evaluation for Public Health Interventions and Research*. (Jossey-Bass, 2002).

58. Gittelsohn, J. *et al.* Process evaluation of Baltimore Healthy Stores: a pilot health intervention program with supermarkets and corner stores in Baltimore City. *Health Promot. Pract.* **11,** 723–32 (2010).

59. Nanney, M. S., Johnson, S., Elliott, M. & Haire-Joshu, D. Frequency of eating homegrown produce is associated with higher intake among parents and their preschool-

aged children in rural Missouri. *J. Am. Diet. Assoc.* **107,** 577–584 (2007).

60. Salois, M. J. Obesity and diabetes, the built environment, and the 'local' food economy in the United States, 2007. *Econ. Hum. Biol.* **10,** 35–42 (2012).

61. Curtis, J., Creamer, N. & Thraves, T. E. *From Farm to Fork: A guide to building North Carolina's sustainable local food economy*. (2010). at <http://www.cefs.ncsu.edu/resources/stateactionguide2010.pdf>

62. McEntee, J. Contemporary and traditional localism: a conceptualisation of rural local food. *Local Environ.* **15,** 785–803 (2010).

63. Dunne, J. B., Chambers, K. J., Giombolini, K. J. & Schlegel, S. a. What does 'local' mean in the grocery store? Multiplicity in food retailers' perspectives on sourcing and marketing local foods. *Renew. Agric. Food Syst.* **26,** 46–59 (2011).

64. Martinez, S. *et al.* Local Food Systems: Concepts, Impacts, and Issues. (2010).

65. USDA Economic Research Service: State Fact Sheets. (2015). at <http://www.ers.usda.gov/data-products/state-fact-sheets/state-data.aspx?StateFIPS=37&StateName=North Carolina#.Ud8ALvm1HTo>

66. Rural Health Information Hub: North Carolina. *Rural Health Information Hub* at <https://www.ruralhealthinfo.org/states/north-carolina>

67. Feldmann, C. & Hamm, U. Consumers' perceptions and preferences for local food: A review. *Food Qual. Prefer.* **40, Part A,** 152–164 (2015).

68. US Census Bureau. 2010 Census Urban and Rural Classification and Urban Area Criteria. at <https://www.census.gov/geo/reference/ua/urban-rural-2010.html>

69. US Census Bureau. American FactFinder - Community Facts. *American Community Survey* (2012). at <http://factfinder2.census.gov/faces/nav/jsf/pages/community_facts.xhtml>

70. Befort, C. A., Nazir, N. & Perri, M. G. Prevalence of obesity among adults from rural and urban areas of the United States: findings from NHANES (2005-2008). *J. Rural Health* **28,** 392–7 (2012).

71. Trivedi, T., Liu, J., Probst, J. C. & Martin, A. B. The metabolic syndrome: are rural residents at increased risk? *J. Rural Health* **29,** 188–97 (2013).

72. O'Connor, A. & Wellenius, G. Rural-urban disparities in the prevalence of diabetes and coronary heart disease. *Public Health* **126,** 813–20 (2012).

73. Moonesinghe, R. & Beckles, G. L. A. Measuring health disparities: a comparison of absolute and relative disparities. *PeerJ* **3,** e1438

74. *Healthy People 2020*. (2010).

75. Larson, N. I., Story, M. T. & Nelson, M. C. Neighborhood environments: disparities in access to healthy foods in the U.S. *Am. J. Prev. Med.* **36,** 74–81 (2009).

76. Johnson, D. B. *et al.* Developing an agenda for research about policies to improve access to healthy foods in rural communities: a concept mapping study. *BMC Public Health* **14,** 592 (2014).

77. Burger, J. M. *et al.* Nutritious or Delicious? The Effect of Descriptive Norm Information on Food Choice. *J. Soc. Clin. Psychol.* **29,** 228–242 (2010).

78. Payne, C. R. & Niculescu, M. Social Meaning in Supermarkets as a Direct Route to Improve Parents ' Fruit and Vegetable Purchases. *Agric. Resour. Econ. Rev.* **41(1),** 124–137 (2012).

79. Cialdini, R. B. Crafting normative messages to protect the environment. *Curr. Dir. Psychol. Sci.* **12,** 105–109 (2003).

80. Fennis, B. M., Janssen, L. & Vohs, K. D. Acts of Benevolence: A Limited-Resource Account of Compliance with Charitable Requests. *J. Consum. Res.* **35,** 906–924 (2009).

81. Janssen, L., Fennis, B. M., Pruyn, A. T. H. & Vohs, K. D. The path of least resistance: Regulatory resource depletion and the effectiveness of social influence techniques. *J. Bus. Res.* **61,** 1041–1045 (2008).

82. Wansink, B. & Sobal, J. Mindless Eating: The 200 Daily Food Decisions We Overlook. *Environ. Behav.* **39,** 106–123 (2007).

83. Lun, J., Sinclair, S., Whitchurch, E. R. & Glenn, C. (Why) do I think what you think? Epistemic social tuning and implicit prejudice.

84. Gudzune, K. a *et al.* Increasing access to fresh produce by pairing urban farms with corner stores: a case study in a low-income urban setting. *Public Health Nutr.* 1–5 (2015). doi:10.1017/S1368980015000051

85. Yin, R. K. *Case Study Research: Design and Methods*. (Sage, 2014).

86. Glanz, K., Bader, M. D. M. & Iyer, S. Retail grocery store marketing strategies and obesity: an integrative review. *Am. J. Prev. Med.* **42,** 503–12 (2012).